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AN INVESTIGATION INTO THE POTENTIAL OF A MINDFUL DESIGN INTERVENTION IN ACADEMIC MULTIDISCIPLINARY COLLABORATIVE DESIGN SETTINGS, TO REVEAL DESIGNER VALUES AND TO ENHANCE SOCIAL INTERACTION

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PHD

2020

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A thesis submitted as partial fulfilment
of the requirements of the
University of Northumbria
at Newcastle for the degree of
Doctor of Philosophy

Research undertaken
in the Faculty of Arts,
Design and Social Sciences

November 2020

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Abstract

This doctoral programme explored intersections between design and mindfulness. The thesis describes an exploratory embedded multiple-case study methodology where: (1) critical analysis of relevant literature informed the development a literature-supported design-relevant mindfulness intervention, or *mindful design device*; (2) qualitative data collection and analysis methods were used to develop theoretical categories to represent designers' evolving personal and professional values in an academic multidisciplinary collaborative design setting; and (3) qualitative data collection and analysis methods were used to assess designers' perceptions of impact into their social interaction resulting from engagement with the mindfulness intervention.

A significant feature of the *mindful design device* is that, as part of the mindful reflection process, it generates unique and rich sets of data that reveal designers' evolving values. The suggested major categories of designers' values in context with collaborative design arising from the analysis are: *Efficacy, Relationality, Development and Achievement*. Further study findings demonstrate that upon engagement with the device, designers become more aware in specific ways of, not only *interpersonal*, but also *intrapersonal* aspects.

It is argued that greater understanding of what motivates design decisions, as well as increased development of attentiveness in social interactions along with other mindfulness effects, are vital for constructive mediation in design education and design practice. It would be reasonable to assert that well developed mindfulness-based collaborative design skills empower designers to exercise their capacities relevant to the design task, as well as to work collaboratively with others to achieve shared goals.

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Acknowledgements

A project of this stature cannot happen without the meaningful involvement of a number of people. Some have put their reputation and trust on the line so that I could have a chance to make a worthy contribution. Some have shown a level of care that goes far beyond mentorship. Some have demonstrated in no uncertain ways that they are true friends. Some have been the bedrock on which I hinged at times when challenges seemed insurmountable. And some have continued to be the reason and inspiration of why I would even do this, or anything worth doing. In the end, it seems obvious that it is mostly me who has benefited immensely from this experience and I believe that the next logical step is to pay it forward.

My father enjoyed seeing this process, and I am grateful to have been able to spend the last few years of his life near him. I know he was looking forward to seeing this come to fruition.

I hope he is able to somehow.

Author's Declaration

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work fully acknowledges and attributes opinions, ideas and contributions from the work of others.

All ethical clearance for the research presented in this thesis has been approved. Approval has been sought and granted by Northumbria University Research Ethics and Governance on 11/26/2015.

Fernando Miguel Rojas Otero
November 2020

Chapter 1
INTRODUCTION

Contents

1.1 Personal Statement

The genesis of this doctoral program was a keen interest in exploring the intersections between *what-one-is* and *what-one-does*. In this case, it is the junction between the practicalities of a professional design practice, and the sensibilities of a personal mindfulness practice. This study's researcher is trained in visual communications design with professional commercial experience spanning well over two decades at the time of this writing. In tandem, about the same time has been invested in the exploration of the philosophy and science of Yoga as well as other related practices. Interest in academia, including pursuing Master and PhD degrees, publishing, and teaching, developed over the last decade. More specifically, the scrutiny of the potential junctions between mindfulness and design. This curiosity about finding potential gaps and contribution opportunities resulted in the development of this doctoral study.

The act or attitude of mindful attention is highly valued in wisdom traditions to achieve agreeable levels of awareness, to support physical and mental health, and to stimulate desirable human qualities. Fields such as psychology, neuroscience and physics recognize the scientific value of these mental states, also referred to as *living-consciousness* or as *presence*. They suggest a wide range of attributes to the application of mindful attention; from the organization of particles at the quantum level, to neuroplasticity, and to the management and development of a diverse and beneficial array of human cognitive, physical and mental conditions and aptitudes.

The practise of mindfulness is widely researched and can be understood as a way to train the 'muscle' of attention to improve the ability of an individual to have an accepting and discerning awareness of their

immediate experience. Some of the effects of such a discipline appear to promote behaviour that has been termed non-egocentric, or 'ecocentric'. It could be argued that the influence of this state of mind is the stimulation of an emergence, or better yet, a resurfacing of an underlying intelligence which has the tendency to support a balanced, cohesive and symbiotic interaction of all living systems. Akin to the autonomic functions of organisms that support health, the cooperative processes of sustenance in nature that underpin survival, it would seem as if behaviour considered 'moral', ‘ethical' or ‘ecocentric’ arises out of mindful attention. It may be, not that behaviour changes to consider a greater good, but that as attention is improved, behaviour reflects such overarching cohesive intelligence that all organisms possess.

1.2 Research Interests

This study's topic of interest, which is discussed by some design academics (Vyas et al. 2012; Spencer 2008, 2010; Owen 2007; Young 2012; Niedderer 2013; Vyas & Young 2011; Young, Blair & Cooper 2001; Akama 2015; Akama & Prendiville 2013; Howard & Melles 2011; Bosse, 2019; Bosse Wölfel & Krzywinski, 2018), is the concept of mindfulness and its relevance to design. Many stories stemming from wisdom tradition texts point to the value of bringing the theory of mindful being to urban settings, where they can really be put to the test (Roach & McNally 2009; Nhat Hanh 1975; 1991). Thousands of years of refinement in traditional contexts, and four decades of rigorous scientific research (Ergas 2013; Harrington & Dunne 2015) support the potential value of such practices in many applications of modern human endeavour and in this case, in design.

Mindfulness is a mind training process that involves:

- an observer,
- an object of observation, and
- a way to observe.

The potential for developing the skill of sustaining a mindful attitude resides in the practice of differentiating the observer from the observed object, and that the way to observe is open (receptive) and present, as opposed to mindless and reactive. In other words, it is sought to form a discipline of paying attention in this way so that a skill is developed and it may permeate ways of being. A way to understand such a receptive way of observing is by caring to deliberately perceive and consider more (or new) aspects of known or habitual situations. For example, the experience of a *non-toothache*. Happening now to most of us, but not necessarily

attended to or appreciated. It is this researcher's view that the value of presence may not be as a substitute to reactions, but as a skilled relationship with the inevitability of tacit knowledge arising.

What is proposed in this document, is a literature-supported, design-relevant description of an interpretation of mindfulness. Design literature positions mindfulness as a modern soft skill that should be more explicit in design applications and education, especially the more contemporary ones involving participation and collaboration (Howard & Melles 2011; Owen 2007; Vyas et al. 2012; Akama & Prendiville 2013; Akama 2015; Niedderer et al., 2017).

Literature in the Social Sciences suggests that the practice of a form of mindfulness described as *intrapersonal attunement* has effects which are relevant to *interpersonal* concerns (Siegel 2010; 2012). The technique stems from a systems view of the self as a multitude of interrelated aspects, some of which may appear to be contradictory, yet are all part of the same system (ibid). In essence it is about recognizing previously unobserved, *non-toothache-like* aspects of our perception. This process would seem to lead to more informed inner perceptions and moreover, this sustained practice of self-observation individually leading to increased self-knowledge, is claimed to improve interpersonal relationships (ibid); a pertinent aspect of collaborative design applications. Specifically, some of the more relevant claims in research literature are that through a formed discipline of mindfulness:

- perceptions are more informed (Langer 2000; Langer 2014).
- multiple open perspectives are more considered (as opposed to closed rigid single perspectives) potentially nourishing innovation (Langer 2000; Langer 2014), and

- areas of the brain responsible for interpersonal relationships are enhanced (Siegel 2010; 2012).

In an approach to mindfulness within design, the individual designer could integrate (possibly conflicting) elements of their perception through deep self-observation of design-relevant objects of attention, arguably with the potential of bringing to the fore previously unconscious inner aspects that impact design decisions. Furthermore, if social interaction is enhanced, then it can potentially result in improved design collaboration.

This thesis will describe:

- the rationale behind the design and implementation of a design-relevant mindfulness intervention, or *mindful design device,* that generates unique rich data around designers' personal and professional values;
- the process of analysis which underpins the emergence of a theoretical framework of designers' values in an academic collaborative design context;
- the perceived effects on designers' interpersonal concerns upon engagement with the *mindful design device*.

1.3 Context

The precursor for this programme was the curiosity about finding potential gaps and contribution opportunities regarding the intersection of design and mindfulness. This interest resulted in the development of this doctoral study. For this it was necessary to explore how the topic of mindfulness is approached in design literature and also to establish a literature-supported understanding of the term in order to contextualize it in design conversation. Mindfulness literature suggests that although there is much research on the topic over four decades, there is confusion and ambiguity on the way it is described (Hart, Ivtzan & Hart, 2013). This study does not aim to resolve this. Instead, a synthesized and informed view is suggested to construct an understanding that is relevant to design and to this study's interests.

Thus, two main initial research questions underpin this literature review and analysis:

- RQ1: *How is mindfulness understood and described in design literature?* This undertaking illuminated some of the ways the term mindfulness is brought to bear in design academic discussions.
- RQ2: *How can a mindfulness intervention be relevant to design?* A way to understand it was constructed through a review of mindfulness academic and traditional literature, and by critical analysis of intersections with design. Upon reaching such understanding, a *mindful design device* was designed considering relevant aspects of mindfulness and of design.

The study's literature review answers these basic research questions resulting in the identification and analysis of intersections between mindfulness and design. Thus, a literature-supported design-relevant

mindfulness-based intervention was developed and described. Two more research questions emerged stemming from this critical analysis after having established the following premises:

- that designers' personal and professional values are viable objects of mindful attention relevant to design; and
- that improved interpersonal relationships are both, a suggested mindfulness benefit, as well as an area of opportunity for contribution in contemporary design contexts.

The two additional emerging research questions are:

- RQ3: *What kinds of personal and professional values arise upon mindful reflection in context with collaborative design?*
- RQ4: *Does engagement with the mindful design device have an enhancing effect on designers' interpersonal relationships?*

In this light, the following opportunities surface and can help to expand the scope of this study's contributions:

- To describe the *mindful design device's* potential in generating rich unique data that helps to inform about designers' evolving personal and professional values.
- To propose a qualitative categorisation method of designers' evolving personal and professional values.
- To report on the perceived mindfulness effects that designers reveal about their social interactions upon engagement with the *mindful design device*.

1.4 Research Approach

Supported by a multiple-case study structure, this research sought to develop theoretical categories to represent designers' evolving personal and professional values; and also to assess designers' perceptions of impact of the *mindful design device* intervention into their social interactions.

One of the intervention's important properties is that it generates unique data that stems from the tool's object of mindful inquiry. This data provides the opportunity to analyse and develop theoretical categories about what motivates designers in particular contexts, in this case, designers in a collaborative design context. Thematic coding, understood in this study as a form of thematic analysis (TA), was determined to be suitable in this programme's data analysis. A unique aspect about thematic coding is that it incorporates grounded theory (GT) techniques along with other qualitative methods (Maxwell & Chmiel, 2014; Rivas, 2018; Gibbs, 2007). In this light, this study sought to embrace thematic coding as a categorising method explicitly incorporating GT techniques.

To assess the effects of the *mindful design device* upon participants' social interactions, a supplementary data set was collected at the end of the study period through an open-ended final reflection to explore the participants' perception of. A qualitative analysis process was applied consisting of:

- conjecture and refutation,
- thematic coding analysis, and
- framing of the data around mindfulness effects relevant to design concerns.

Increased awareness was evidenced in several focused ways of intrapersonal and interpersonal aspects of the participants. These focused effects suggest a transformation, upon engagement with the *mindful design device*, in the way interpersonal and intrapersonal relationships are conducted in collaborative design contexts.

The study consisted of participants engaging on a suggested daily (or almost daily) frequency with the *mindful design device* over a period of 30 calendar days. The main set of participants is composed of 14 design students who were in their first semester of a Multidisciplinary Innovation Masters programme[1] at Northumbria University, Newcastle, UK. The group consists of students from diverse disciplines who learn design-led innovation working collaboratively on real projects with external organisations. During the programme period, an opportunity arose to apply the data collection and analysis methods to a similar collaborative design participants group. All participants in this group were design multidisciplinary PhD students and/or academic researchers.

[1] Multidisciplinary Innovation MA at Northumbria University. (n.d.). Retrieved from https://www.northumbria.ac.uk/study-at-northumbria/courses/multidisciplinary-innovation-dtfmdy6/

1.5 Chapters Overview

Chapter 2 - Literature Review: This chapter answers the first two (2) basic research questions resulting in the identification and analysis of intersections between mindfulness and design. This resulted in the development and description of a literature-supported design-relevant mindfulness-based intervention.

Chapter 3 - Methodology: This chapter addresses the rationale behind the methodology that was implemented. To this end, design and social science research traditions are discussed; a suitable research methodology strategy is established; and finally, the processes of analysis and findings are detailed.

Chapter 4 - Data Analysis for RQ3: This chapter contains an exemplar of each of the categories of the data, and describes the full analysis pertaining to Research Question RQ3: *'What kinds of personal and professional values arise upon mindful reflection in context with collaborative design?';* as it was collected. The full extent of the data can be found in Appendix D.

Chapter 5 - Data Analysis for RQ4: This chapter contains exemplars of the data collected, and describes the full analysis pertaining to Research Question RQ4: *'Does engagement with the mindfulness-device have an enhancing effect on designers' interpersonal relationships?'* The full extent of the data can be found in Appendix E.

Appendix A - Published papers. Published as of the date of this document's submission.

Appendix B - Audit Trail. Document presented to peers for review in order to improve the trustworthiness of the qualitative research conducted in this programme and the results of the audit.

Appendix C - Future quantitative possibilities. Research design for a potential quantitative approach to establishing correlations between collaboration and mindful disposition.

Appendix D - Data presentation for Research Question RQ3. Full extent of the data pertaining to RQ3.

Appendix E - Data presentation for Research Question RQ4. Full extent of the data pertaining to RQ4.

Appendix F - Induction and data collection forms. Display of forms used in this study's system of induction and data collection.

Appendix G - Dynamic Stakeholder Tool. An early iteration of the *mindful design device* that, even though was not used for the study, it supported research publishing and supplemented a master level multidisciplinary collaborative design course.

Chapter 2
LITERATURE REVIEW

Contents

2.1 Introduction

The precursor for this literature review is the curiosity about finding potential gaps and contribution opportunities regarding the intersections of design and mindfulness. This interest resulted in the development of this doctoral study. For this it was necessary to explore how the topic of mindfulness is approached in design literature and also to establish a literature-supported understanding of the term in order to contextualize it in design conversation. It's important to establish that mindfulness literature suggests that although there are over four decades of research on the topic, there is confusion and ambiguity in the way it is described (Hart, Ivtzan & Hart, 2013). This study does not aim to resolve this. Instead, a synthesized and informed view is suggested to construct an understanding that is relevant to design and to this study's interests.

Thus, two main initial research questions underpin this literature review:

- RQ1: *How is mindfulness understood and described in design literature?* This undertaking illuminated some of the ways the term mindfulness is brought to bear in design academic discussions.
- RQ2: *How can a mindfulness-based intervention be relevant to design?* A way to understand it was constructed through a review of mindfulness academic and traditional literature, and by critical analysis of intersections with design. Upon reaching such understanding, a *mindful design device* was designed considering relevant aspects of mindfulness and of design.

Thinking about design is shifting its focus from 'small' problems such as aesthetics, image and fashion, to designing participatory systems that

tackle ‘big’ issues with design briefs that aim to answer questions related to global warming, education, clean water, etc. (Brown, 2009).

Juul-Sørensen (2014) calls this designing for the 99% of people for whom a luxury product is clean water as opposed to an expensive handbag. Whilst collaborative design increasingly aims to address issues of social responsibility and sustainability, Young (2012) contends that there is limited progress in refocusing discernible dysfunctions in the nature and purpose of design discourse and practice. Intrinsic design approaches exhibit more egocentric (style) tendencies than ecocentric (human issues) ones, accelerating unsustainable processes by being more part of the problem than part of the solution (Manzini, 2007).

As new approaches to design emerge, mindfulness is discussed as a skill that should be made more explicit in design education. Research on the topic of mindfulness spans about four decades in various fields of study and several streams of research approaches have expanded the ways it is described. Diverse human qualities that are associated with these practices are also deemed important for designers. Whilst this is so, design literature explores only a few examples of ways to integrate it into design-learning environments. This review seeks to establish that a *mindful design device* can make the role of mindfulness explicit in design education and enhance a designer’s inner awareness. Inner awareness is considered fundamental to also enhance awareness of our relations with others and with the world, which is important for emerging collaborative design contexts. That being said, it is also reasonable to assert that all design choices have a relational aspect to it, whether explicitly as collaborative or in individual contexts.

The designer's role in some collaborative models of design is to become a facilitator instead of an individual creator, in a process where the users and professionals from other fields are participating directly in the creation of the design outcome (Maase & Dorst 2006; Young 2012; Hocking 2011). These approaches bring designers together with stakeholders and experts from other disciplines to achieve innovative system models and rely on new skills such as active listening, empathy and mindfulness (Howard & Melles, 2011). Designing is being recognized as not only a technical and a cognitive process, but also as a social process where it is important to consider their interactions with others and to observe the social interactions that permeate the activities of collaborative design (Cross & Clayburn Cross (1995).

***2.2 Collaborative* Design**

The views of design activity as a social process are an important driver for this study along with the association of mindfulness to the potential of enhanced interpersonal relationships in design social interaction. In the context of design, a number of researchers have demonstrated interest in the challenges of design teamwork and multi-disciplinary collaboration where human relationships are exposed to the full range of social interactions. The design research community has recognized collaboration and communication challenges in multi-disciplinary design teams (Cross & Clayburn Cross, 1995; Bucciarelli, 2002; Badke-Schaub et al., 2007).

Social aspects of collaboration-based design such as roles (Mcdonnell, 2009), negotiation strategies (Mcdonnell, 2009, 2012; Kleinsmann, & Valkenburg, 2008), conflict-resolution (Oh & Sharpe, 1996), effective communication (Chiu, 2002; Piirainen, Kolfschoten, Lukosch, 2009), and even the consideration of collaborative design, as a discrete skill in itself for designers (Kleinsmann, Deken, Dong & Lauche, 2012), are discussed. The idea of roles (or *selves*), is part of the considerations of this study's mindfulness intervention. All human interactions have a role associated with it and thus are an inescapable aspect of interpersonal relationships. In context with collaboration-based design, Mcdonnell (2009) highlights the blurred lines in the interrelations between the assumed or assigned roles of team members as arising attributes of social interaction which are not intrinsic to a person, and thus become an added complexity to negotiations. He is referring to roles associated with the process of designing in teams. As it will be discussed later, stemming from the idea that designers' values, including both professional and personal, impact

design decisions, this programme deliberately explores other roles an individual may play in other aspects of their daily life.

Some of the roadblocks to efficient multi-disciplinary team communication in design collaboration activities that are recognized in literature are: mistrust, prejudices, conflicts of interest and goals, and lack of shared clarity about the content of design (Kleinsmann & Valkenburg, 2008). The potential for disagreement of course ensues. Oh & Sharpe (1996) warn that if pervasive conflicts are not managed cautiously in a multidisciplinary design approach, it can result in disorder and incoordination.

Beyond the conflicts and disagreements inherent to team social interaction, some design researchers also explore possible collaborative challenges that could emerge from the way design skills are developed overtime. Young (2012) proposes that *metic* tendencies in designers may lead to ambiguity, subterfuge, loss of empathy and distrust in the collaborative design process. Metic intelligence is described by Raphals (1992) as an attitude of mind or mode of action acquired through long practice of repetition of similar tasks, and frequently displayed without conscious deliberation. It is a knack or ability to respond spontaneously to changing circumstances that is often associated with trickery, cunning, obliqueness and deception. Alternatively, it can also become resourceful intelligence if fused with moral qualities and harnessed in the service of a legitimate cause (ibid). This fluid ability is akin to the tacit skills acquired overtime through design learning and practice in the continuous engagement with design's ambiguity and uncertainty. Young (2012) likens it to the concept of artistry, defined by Schon (1991), as the competence displayed by designers in unique, uncertain and conflicted situations of practice. If this is true, then the degree of awareness of the practitioner of

both: (1) the implementation of the skill and, (2) that of the project's mission or purpose, can influence the outcomes associated with the application of this intelligence. In terms of participation in multidisciplinary teams, the clash of egos (Vyas & Young 2011) is considered a core dysfunction of co-creation; and Hocking (2011) highlights that disorienting feelings ensue in non-designers as they are introduced to fluid engagement with the ambiguous and uncertain nature of designing.

Mcdonnell (2012) raises the question of whether the skills associated with social interaction in any collaborative setting differ from those associated specifically to social interaction in a design collaborative setting. One such skill, he suggests, could be to be able to progress in the collaborative design process without the need to resolve disagreements between the collaborators' perspectives, while at the same time maintaining an awareness of them (ibid). In this sense, it seems as if there's interest in positioning and investigating collaborative design as a category of design pursuit on its own (Piirainen, Kolfschoten & Lukosch, 2009; Kleinsmann, Deken, Dong & Lauche, 2012).

Shifting the understanding of design from a technical to a social process, and recognizing that design teams are becoming increasingly important, conflicts, disagreements and their resolution are an inevitable aspect of collaborative design. In this light, 'social interactions, roles and relationships cannot be ignored in the analysis of design activity performed by teams' (Cross & Clayburn Cross, 1995, p28). Mcdonnell (2012) suggests that the technical and procedural aspects of design innovation need to be complemented with an understanding of design collaboration in order to have constructive interventions in design education and design practice settings. A shared design goal necessitates expertise on the

design task at the same level as competency in collaboration (ibid). Collaboration is about social interactions and whilst the context of possible conflicts and disagreements in design collaboration are specific to the design task, it remains true that members of a team need to develop interpersonal skills in order to build trust and manage conflict arising both from the task and from social interactions (Kozlowski & Ilgen, 2006). Later in this chapter, some further potential dysfunctions of collaborative design are discussed in the context of mindfulness and mindlessness.

A question arises of course about clarifying what interpersonal skills are, and moreover how can mindfulness support their development. Some researchers, for example, have developed typologies of interpersonal skills aimed at building trust (Klein, DeRouin & Salas, 2006). Oh & Sharpe (1996) see conflict as an inherent part of interdisciplinary design and differentiate between conflicts relating to the process of collaborative design, and those due to 'socio-psychological factors like human emotions' (p249). Regarding aspects of the design collaboration process, they explain that conflict occurs when team members:

- are required to engage in an activity that is incongruent with their needs or interests,
- hold behavioural preferences, the satisfaction of which is incompatible with another person's implementation of their preferences,
- have partially exclusive behavioural preferences regarding their joint action and are interdependent in the performance of their functions or activities.

They describe conflict due to socio-psychological factors as human emotions, for example, hostility, ill-feelings, anxiety, anger, fear. etc. (ibid

p249). The concept of mindfulness is not by definition a direct solution to a specific cause of conflict or disagreement such as mistrust or hostility. As it will be explained, it is an awareness-based practice that appears to have effects that can be correlated to the discipline; and those effects in attentiveness seem to reduce reactive, emotional or unconscious behaviours. In this light, this study seeks to in fact assess whether any enhancement to social interaction can be detected and if so, in what way.

2.3 An Understanding of Mindfulness

To allow for a broad understanding of the term, it is important to establish a difference between the practise of mindfulness and the effects of mindfulness. The practise of mindfulness is a discipline of paying attention in particular ways (Kabat-Zinn 2005; Langer 2004; Siegel 2012); the effects of mindfulness are the resulting attitudes, dispositions and/or the mental and physiological benefits of engaging with the practise. The concept of mindfulness originates in wisdom traditions and is described by Feuerstein (2003) as the underlying mechanism of meditation. When referring to a mindfulness exercise designed to be included as part of a research study, it is often called an intervention (Creswell 2017; Ivtzan 2013; Strauss et al., 2014).

In contrast with mindfulness, mindlessness is described as automatic action that can actually be useful since it unfetters the mind to execute higher levels of cognitive functioning (Langer, 1992; 2014). The argument against mindlessness is that too much mental information processing seems to be mindless, and studies reveal that running on autopilot for too long can be detrimental to those same cognitive functions (Kahneman, 2011; Langer, 1992, 1997, 2014; Langer & Piper, 1987).

One way to describe these techniques is to focus attention in a non-analytical way, and to not dwell on ruminating thought (Austin 1999). The techniques are mental exercises that range widely from breath, body and/or emotion awareness, to various other forms of active and passive meditative activity (Ekblad 2008; Lazar et al. 2005; Kabat-Zin 2002). Langer (2000) describes it in a different way as noticing new things, and

as an embrace of uncertainty through the re-labelling of absolute or unconditional truths to probability statements.

Traditional texts illustrate the concept clearly. In terms of the attitude towards an action, it is illustrated in the following way:

> *There are two ways to wash the dishes. The first is to wash the dishes in order to have clean dishes and the second is to wash the dishes in order to wash the dishes. (Nhat Hanh, 1975, p4)*

In terms of noticing novelty in previously unobserved aspects of a familiar situation, the following point of view is suggested:

> *When we have a toothache, we know that not having a toothache is a wonderful thing. But when we do not have a toothache, we are still not happy. A non-toothache is very pleasant. There are so many things that are enjoyable, but when we don't practise mindfulness, we don't appreciate them. (Nhat Hanh, 1991, p34)*

Thich Nhat Hạnh is a well-known Buddhist leader whose teachings are framed around mindfulness. He refers to it as keeping consciousness alive to the present reality. Whilst sitting or passive meditation is still a pillar of the traditions, mindfulness is described as a meditative mental state that can permeate all aspects of daily life. He explains:

> *The chances (for mindfulness) are scattered everywhere: in the bathtub, in the kitchen sink, on a cutting board … literally anywhere. The moments and places of silence and stillness are wondrous and helpful, but not indispensable. (Nhat Hanh, 1975, p107)*

Meditative frames of mind appear to pivot around the quality of attentive engagement with internal or external perceived stimuli. For example, novelty is discovered in previously unobserved aspects of a situation, as in a 'non-toothache' (Nhat Hanh, 1991, p34). Langer (2005, p214) describes mindfulness as 'actively drawing novel distinctions' or 'openness to novelty', leading to more informed perceptions. In this light, a potential way that mindfulness could be integrated in context is through discovering as novel, previously unobserved aspects of (in this case) design processes. The specifics of how the mindfulness intervention designed for this study accomplishes this are discussed later in this chapter.

The suggested claims or benefits of engaging with mindfulness-based practices are broad. The practice is interpreted and applied to western research mostly with a focus on its potential benefits on physical and mental health, as well as on the suggested emergence of human qualities like: empathy (Shapiro et al., 1998; Krasner et al., 2009), spontaneous non-egocentric action (Rosch, 1997), social connectedness (Hutcherson et al. 2008), compassion and eco-centricity (Austin, 1999). The term mindfulness is used both to describe a process as well as it's result. Mindfulness (as a mind state) is cultivated by practicing mindfulness (as a method).

In the Buddhist tradition Nhat Hanh (1976) explains it like this:

> *Mindfulness is at the same time a means and an end, the seed and the fruit. When we practice mindfulness in order to build up concentration, mindfulness is a seed. But mindfulness itself is the*

> *life of awareness: the presence of mindfulness means the presence of life, and therefore mindfulness is also the fruit (ibid, p14).*

Terms such as: meditation, awareness, attention, concentration, observation, consciousness and focus, are used interchangeably to contextualize and refer to what this attitude of mind is or can be. And, while the term 'mindfulness' may not be used explicitly or as the main term in all contexts, literature in topics of leadership and social innovation refer to relevant terms such as 'awareness'. In this sense Scharmer and Kaufer (2013) state:

> *The quality of results produced by any system depends on the quality of awareness from which people in the system operate. The formula for a successful change process is not 'form follows function', but 'form follows consciousness'. The structure of awareness and attention determines the pathway along which a situation unfolds (ibid, p317).*

Mindfulness as a method is a form of training attention, and well-developed attention skills have been linked to high levels of performance and excellence (Wallace, 1999; Goleman, 2013). Through mindfulness practice, the areas of the brain that control attention become structurally improved and activated (Lazar et al., 2005; Austin, 1999). Moreover, studies in the field of physics suggest that the act of paying attention not only has a direct effect on what is observed, but it is part of the nature of its reality. Particles at the quantum level exist only as potential, or tendencies to exist until observed, and their properties can only be understood in terms of their interaction with the observer (Capra, 1982). A series of studies known as the Princeton Engineering Anomalies Research

(PEAR) have suggested that attention is responsible for creating our reality (McTaggart 2001).

2.3.1 Meditative and Socio-Cognitive Mindfulness

Literature recognizes two predominant streams of mindfulness research and practice: meditative mindfulness and socio-cognitive mindfulness (Yeganeh & Kolb, 2009; Djikic, 2014). Meditative mindfulness is associated with work like that of Kabat-Zinn (1990), which is influenced by traditional Buddhist meditation and where the breathing cycle or body sensations are used as objects of attention deliberately observed throughout sustained discipline overtime. Recognizing the *observing self* (Deikman, 1982) is another known approach that claims that to the extent that we are able to observe the contents of our consciousness, we are no longer completely embedded in or fused with such content (Shapiro et. al, 2006). Suggested human qualities of mindfulness such as social-connectedness and eco-centricity as mentioned, are generally associated with research in meditative mindfulness.

Langer (2000) defines socio-cognitive mindfulness as a process of drawing novel distinctions, with emphasis on situational awareness and context. She clarifies that whilst the qualities of mindfulness as emerging from this work are similar to eastern concepts, this definition of mindfulness does not consider the moral idea that a mindful state leads to spontaneous right action (Langer, 2014). She does, however, conduct research that suggests a non-dualist view of the mind and the body (Langer, 2009), which is relevant in eastern philosophical contexts. In this approach the mindfulness techniques revolve around actively noticing new things or differences about a familiar object, person, situation; engaging in

new ways with habitual or skilful action; and embracing uncertainty through relabeling absolute or unconditional truths as probability statements. Yeganeh & Kolb (2009) describe other supplemental practices of socio-cognitive mindfulness such as: placing value on doubt, looking for disconfirming data and producing new ways of thinking and acting. A way to contrast these two approaches to mindfulness is that meditative mindfulness suggests effects that arise overtime and post-practice, and socio-cognitive mindfulness claims an immediate heightened state of involvement and wakefulness or being in the present (Langer, 2000).

Nonetheless, traditional eastern approaches do promote a kind of attention-in-action that is pertinent to the situational context of socio-cognitive mindfulness. Time-honoured meditative practice is often associated with sitting in place for a period of time while engaging with objects of attention. It is a kind of introspective journey of cognitive perception. This is attention training that results in post-practice effects that 'slowly permeate your life' (Spencer, 2008: p315). Yet, these traditions have many examples of situational *attention-in-action* mental training as well. Zen Buddhism practices such as walking meditation, archery, calligraphy and tea ceremonies seek to perfect performance through present moment engaged action. Still, the teachings extend further to common daily experience.

These teachings aim to train a person to actively attend to the details of their immediate experience of action engagement as they emerge. This attention training attempts to remove the need to prioritize and/or focus on outcome and assigns value to enhanced awareness of the process as it unfolds. The socio-cognitive approach for mindful engagement leads to the same result through an alternate view of the process. In this approach, the

effort to elicit being in the present throughout the action, is not by deliberately focusing on the process details as they emerge, but through seeking novel distinctions in, and of, a process that is usually familiar and habitual; or where routines and habits are more likely to control or influence our behaviour (Langer, 2000). Whether novelty is eventually recognized is irrelevant because the process of seeking novelty is what promotes mindful awareness.

From the reviewed literature, it is reasonable to suggest that the basic components of mindfulness are attention and awareness. Mindfulness, as a method, is a way to pay attention that is deliberate, usually to a chosen object of attention, and with the intention of it being non-judgmental, or objective. It is possible to practice mindful awareness of any aspect of any process, as well as to just attempt to reach an open state of awareness of anything that emerges into the field of attention. This is also known as presence (Parker et al., 2015). For this discussion, mindfulness is understood as a deliberate way to sustain attention to inner aspects, in other words inner awareness. Such inner awareness can be of aspects of the body such as sensations or awareness of processes (like breathing), as well as an objective exploration of processes of the mind, or of perception. As it will be discussed later, this study's *mindful design device* becomes relevant to the field of design by inviting inner awareness of designers' evolving values (which are considered important to design decision making).

2.4 Mindfulness in Design

Owen (2007) considers mindfulness to be a tacit skill in design education and suggests the need for it to be taught explicitly as a design competency. Young (2012) concurs with this view and proposes that the role of mindfulness should be made more explicit and that such practices can promote trust and empathy in collaborative design. He further contends that mindfulness literature addresses the consciousness of an individual, but not the collective consciousness of a group, which is a more relevant issue in developing collaboration approaches to design such as co-design (ibid). Niedderer (2013) values mindfulness as a mindset that considers different perspectives to create new categories, and that is key for designing for behaviour change. Vyas & Young (2011) claim that it promotes co-design output that is more 'co-owned' and addresses real human needs. They also consider the 'clash of egos' to be a core dysfunction of co-design. Vyas (2014) has investigated if mindfulness can also promote ecocentrism in co-design teams. Young (2012) views ecocentrism as an inclusive *design-with* communities approach as opposed to an egocentric *design-for* customer services. In the context of social evolution Scharmer (2014) views this as multilateral creative stakeholder communication that helps co-sense and co-create the future by transforming awareness from ego to eco.

Spencer (2008) considered the benefits a designer may gain from meditative practices including conceptions of stillness and mindfulness. In his work, stillness is described as a shift in perspective that fundamentally changes, to a non-attached way, the manner in which we relate to arising experience and to the objects of our perception; and mindfulness is understood as a non-judgmental way to notice the nature of experience

and to engage the practitioner fully in the present moment. He extracted a number of benefits relevant to designers that are associated with such disciplines. Some of these are: presence, focus, empathic recognition leading to skilful interactions and effective interpersonal relationships, sustained attentive awareness, and reduced hazy states of mind. He concludes that such mental states help draw attention to tacit desires, attachments or aversions, and assist in letting go of attachments thus balancing the way designers respond to a design situation. Rojas, Spencer & English (2012) sought to improve understanding about the dynamic development of designers' professional self-awareness. They introduced the concept of stillness, framed as a competence of design intelligence that is displayed during uncertain situations of design practice. Stillness in this case is defined as mindful awareness and reduced habitual reaction, and their claim is that by experiencing this state of mind, a designer's perception is less fixated, thus becoming open to the full potential of design situations and transforming themselves and the world through design.

Akama & Light (2015) frame a description of mindfulness against the notion of mindlessness when designing. This view highlights a reflective and collective awareness of our relational existence in broad ecologies. They use the term *reflection* contrasting it to critical reflection, in that mindful open-ended reflection is reflection undertaken as mindfulness, where reflection itself is experienced and not used to reflect on experience. Furthermore, they suggest that mindlessness in living and in designing may lead to poorly considered ecological outcomes. In their view, designing makes an unaware contribution to a disconnected view of how our lives are implicated with other constituents of the world, thus causing systemic impact and unsustainable futures. From their

perspective, designing mindfully may raise awareness of unsustainable impacts and possibly promote a less materialist culture. Young et al. (2001) relate similar views to the context of design education. They suggest that the current focus of design disregards wider social implications and that we need to be mindful of our unconscious worldviews and our tacit assumptions. Furthermore, they suggest a new approach to design education that embraces the challenge of realigning designers' values so that design can act as a catalyst for positive, sustainable change that honours a world we would want for future generations.

This call for action to create systems that address issues of social responsibility and sustainability is multidisciplinary and other fields share complementary points of view with design views in this sense. Goleman (2013), for example, proposes that a slow-motion systems crash is approaching because of how human systems affect global systems that support life. He suggests reinventing business for the long future by finding shared values that support all stakeholders. Scharmer & Kaufer (2013) speak of a shift from ego-system to ecosystem awareness that involves walking in the shoes of other stakeholders by developing the capacity to suspend old habits of thought, to see the world with fresh eyes, and to empathize by seeing situations through the eyes of someone else. Capra & Luisi (2014) define a sustainable society as one that must be designed so that its ways of life do not intrude with nature's inherent ability to sustain life. In their point of view, societies need to understand that the material world is a network of inseparable patterns of relationships and that the planet as a whole is a living, self-regulating system.

According to Djikic (2014) the purpose of mindfulness is to address mindlessness, which is associated with: (1) a lack of choice that stems

from being dominated by old categories, and (2) a serious and dangerous mismatch between well-entrenched cognitive categories and the emerging (and rapidly changing) world. In other words, a kind of 'autopilot' approach with rigid biases and predetermined rules (Yeganeh & Kolb, 2009) that may resist the ever uncertain and changing nature of reality. This is akin to the ambiguous and uncertain nature of designing. Mindlessness shows some pertinence to *metic* tendencies, as mentioned above, in that their expression may display, to a certain degree, a lack of conscious deliberation. A point of view by Langer (2014) on mindlessness supports this notion. She says that we tend to mindlessly cling to rules and categories through repetition and practice.

2.4.1 Mindfulness and Design Education

Applications and interpretations of Mindfulness have been explored in context with design education. Udall (1996) understands that in order to procure mindful disposition in design students, an interruption of embedded patterns of perception and experience is necessary; and that this is usually enabled by an external agent. He takes this idea to the context of art and design education from this role of external agent by inviting new experiences into the process of creative ideation. Through the motivation of the students to engage in actions that are new and/or never considered before, he suggests that transformation is possible where resistance towards the unknown and unfamiliar can be eased, and familiarization with the process of arising insight can be encouraged.

In an application to industrial design, Bosse, Wölfel & Krzywinski (2018) aim to establish an approach to design known as mindful design (Niedderer 2004, 2007), as a taught design method at the same level of

recognition as others accepted by the field such as user experience design, emotional design, participatory design, co-design or service design. Niedderer (ibid), introduced the concept of mindful design as design outcomes which disrupt the expected function of objects in order to promote mindful disposition in social interaction (more about mindful design later in this chapter). Bosse, et al. (ibid), use a set of visual cards representing mindful design criteria as an educational asset that students can follow and apply during their process of learning design. This undertaking evolves further with the development of a tool to assess whether mindfulness is achieved as a result of interaction with products designed by applying the concepts of mindful design (Bosse, 2019). She asserts that teaching mindful design is a way to introduce mindfulness to design education with the potential to illuminate both the process of learning as well as the process of designing.

2.4.2 Intersections of Mindfulness and Design

Mindfulness and design share a number of intersections that are important to discuss. Overlaps exist in aspects of both concepts that warrant a more profound analysis. This analysis highlights the importance of designer values which became the design-relevant object of mindful observation implemented within this study's *mindful design device*.

The perspective for this blending of mindfulness and design is informed by several inferences. If the qualities that make up a mindful-attitude are also characteristics of creativity (Langer, 2014), then it could be said that designers, by the nature of their training and practice, would tend to develop mindful-awareness disposition. Whilst such mental capacities are associated with moral awareness and are said to foster interpersonal

benefits (Siegel, 2009; 2012), design activity does not appear to have consistent ethical behaviour (Inácio & Gerardo, 2006); and as expressed before, the clash of egos is considered a core dysfunction of co-creation (Vyas & Young, 2011). Similarly, Young (2012) highlights the gap between action and intention, and the need to link purpose and practice for co-designers. He further suggests immersion in developing heuristics to address this in design learning activities.

Designing, as reflective conversation could be considered to inherently integrate both mindless and mindful mental states. Schön (1983) describes an automatic knowing-in-practice as tacit design knowledge that is revealed in the process of designing. This intuitive knowing emerges in the midst of action and designers use this capacity to cope with uncertain situations of practice (ibid). As explained before, Young (2012) suggests that the way such capacity is developed in designers (via repetition of craft practices) can lead to a *metic* tendency (or metis) in designers that, due to the lack of transparency in intent and purpose, can potentially compromise ethical approaches and risk egocentric propensities in multidisciplinary design contexts. Similar to knowing-in-practice, *metic* intelligence refers to skills acquired through long practice of repetition of similar tasks, which are displayed unconsciously as abilities to respond spontaneously to changing circumstances (Raphals 1992). Understandings of mindlessness in literature support this notion as a tendency to automatically hold on to rigid single-perspectives, rules and categories through repetition and practice (Langer 2014).

Hart et al. (2013) shed light on how mindful and mindless mental states may already inhabit designing. They analysed the relations between mindfulness as described by Langer (2014); the model of the two

information-processing systems that govern mindfulness and mindlessness by Kahneman (2011); and the theory of flow (Csikszentmihalyi, 1990). Kahneman's model describes two systems: (1) an automatic, unconscious and under-regulated system1 (S1) at the core of which are emotions, that promotes mindlessness; and (2) a deliberate, conscious and self-regulated system2 (S2) at the core of which is cognitive regulation, that engenders mindfulness. S1's emotions and intuitions create the foundation for choices made, and values and beliefs held. S2's self-regulation controls S1's impulses. Kahneman argues that S2 is deployed into action when information or questions that S1 cannot tackle are encountered, therefore introducing a mindful mode of consciousness to the mix. This, according to Hart et al. (2013), is what creates the state of flow where, whilst immersion in the activity is semi-automatic and unaware of some surrounding events, at the same time there is openness and alertness to emerging and spontaneously arising creative insight. This suggests that designing intrinsically displays this balance of both automatic and mindful states of mind.

Following this logic, if values and beliefs are already imprinted in designing and emerge unconsciously along with skills acquired overtime, arguably the degree of tendency towards moral awareness or to interpersonal collaboration is likely pre-determined at that point. This is important to design as it is broadly substantiated that values and beliefs impact design choices.

2.4.3 Mindfulness and Collaborative Design

Young (2012) points to the importance of addressing the consciousness of a group, as it is relevant to collaborative design. McAllister et. al (2014)

found that trust among team members and mindfulness of alternative points of view are critical elements of a functional team. Studies in socio-cognitive mindfulness applications suggest effects which are pertinent to group consciousness such as: (1) superior coordinated performance in groups (Langer et. al, 2009); (2) improvement in social relationships; (3) more creativity, more effective learning and better decision-making for all stakeholders in organisations (Pirson et. al, 2012). There is pertinence to learning mindful participation in collaborative design contexts, and the notion of superior coordinated performance is chiefly relevant. In Langer's mindfulness study, a group of master symphony performers were told to play a piece of classical music that they repetitively engage with as part of their normal work. The instructions for mindful engagement were to make the action new in subtle ways only the player would know. The study revealed that the performance played mindfully was overwhelmingly preferred over the control group (mindless performing), that the players themselves preferred mindful performing.

Further parallel consideration is possible for this superior coordinated performance as it relates to autonomy. When members were offered the autonomy to make their participation unique in their own way, performance was superior and synchronized. Pink (2011) regards autonomy as one of the pillars of the autonomy, mastery and purpose triad of human motivation; and suggests that science shows that when leaders are willing to offer such independence (and therefore trust) to members of their team, it results in purposeful outcome; akin to eco-centricity. He states: Autonomous people working toward mastery perform at very high levels. But those who do so in the service of some greater objective can achieve even more. The most deeply motivated, productive and satisfied people pull their desires to causes larger than themselves (Pink, ibid).

Furthermore, it could be said that encouraging mindful engagement promotes mastery. Langer et. al (2009) described the highly skilled symphony musicians as bored with the repetitive application of their mastered skills. Pink (ibid), referring to Mihaly Csikszentmihalyi's Theory of Flow, says that in the experience of flow, the activity is its own reward, and people are engaged deeply in the moment. Moreover, he suggests that whilst this engagement leads to mastery, mastery itself is an ever-continuous process that can never be fully realized, but that can always be improved. If master musicians were bored with an action that requires a high level of mastery, it's perhaps because perception of their action fell short of their capabilities resulting in boredom. Mindful engagement appeared to offer a novel goal in the never-ending pursuit of mastery. In fact, Goleman (2013) supports this notion by challenging the myth that only the hours of repetitive practice are what leads to great performance. He says that how experts pay attention makes a crucial difference.

Scharmer & Kaufer (2013) use the example of a jazz ensemble that is in the flow to illustrate a group's capacity for what they call generative listening. They explain that when individual players can pay attention to the whole and at the same time pair their instrument to an arising pattern, they are able to co-create something new in unison. This capacity is part of a model of social evolution that claims that behaviour transformation of systems is tied to the quality of individual and collective attention that people apply to their actions within those systems (ibid). This suggests that systems perspectives must expand to include perceptions of the multiple ways in which a self can be defined. Goleman & Senge (2014) allude to this notion:

> *The more we understand the process of developing systems intelligence, the more we see the close connections between understanding self, understanding other, and understanding the larger systems to which we all belong. (ibid, loc504)*

Capra & Luisi (2014) make a similar point. According to them, the configuration of a system is a 'pattern of relationships within an organized whole' (p9). They refer to integrative design as systems thinking in action and explain that to understand ecological interdependence, relationships must be understood and nourished. This view makes reference to natural and social communities that this analysis will refer to as external systems views. Yet, they extend the systemic understanding of life to 'the inner world of reflective consciousness, which contains a multitude of interrelated characteristics' (p304). They propose that discrete inner conceptions of the self are real and yet, are not separate entities or structures. This analysis will refer to this perspective as internal systems views. Stowell & Welch (2012) describe a system's existence as a description of systemic qualities perceived by an observer. As understood in this document, in external systems the distinct components are (for example) stakeholders, their perspectives and how they relate; in internal systems the distinct components are the different aspects of the self, their values and how they relate. Receptivity to dynamic internal multiple views, potentially highlights the recognition that, parallel to external system views of communities, an individual is a network of interconnected self-conceptions, or self-aspects (McConnell, 2011) some of which may have seemingly contradicting values (Siegel, 2012). Langer (2014) suggests that conflicting information that emerges through mindful-awareness 'throws the discussion back to where it belongs: on individual values' (p.199). Prospectively, this can promote more informed perceptions (ibid),

and a visibility of the workings of the system gathered from multiple points that clarify their dynamics (Goleman, 2013). In other words, this may promote recognition that one aspect of the observed system is not the totality of a systemic reality and that more aspects and their interconnectedness draw nearer to a more complete definition of it. This infers that, in internal systems views, a designer can experience interconnectedness directly through the recognition of multiple self-conceptions with discrete (and sometimes contradicting) values, within one self-entity.

Akama (2015) proposes a similar view of the self as a function of its relational qualities. She offers an interpretation of the Japanese concept of Ma as *between-ness*, to transcend paradigms that separate boundaries such as *self* and *other*. She also suggests that attuning to relational dynamics situates the designer in *inter-relatedness*, builds awareness of the multiple dimensions where designing happens, and forges aware relational connections that bring forth openness (ibid).

Openness is an important feature of systems thinking, co-creation, social innovation, mindfulness, and of design. It is also a shared attribute of the varied constructs of mindfulness in research literature (Hart et al., 2013). Langer (2014) asserts that openness to multiple perspectives is an essential ingredient in mindfulness. Siegel (2010; 2012) refers to openness as an embrace of uncertainty and as a way of being receptive in the experience of connection with others, with our inner world, and to the unfolding of possibilities. From the perspective of design, Akama & Prendiville (2013) describe that the addition of the two letters, ‘co’ in co-designing indicate an openness to ‘embrace the influence, interventions, disruptions, tensions and uncertainties brought to bear by other things and

people' (p32). Akama (2015) says that designers can learn to pursue uncertain paths towards openness, welcome the chance to be open for contingency, and become together through interrelatedness.

According to Scharmer & Katrin (2013), the behaviour of systems can only be transmuted by transforming the individual and collective quality of attention that people apply to their actions within those systems. Moreover, in the context of collaborative design, literature describes the influencing role of the designer (or design team) as a facilitator instead of an individual creator, in a process where all stakeholders are participating directly in the creation of the design outcome (Maase & Dorst, 2006; Young, 2012; Hocking, 2011). If the designer is a facilitator leading a collaborative process, then there is ample potential to promote mindful awareness through the design component. Goleman (2013) claims that teams excel when their facilitators promote three essential attention abilities: (1) inner-focus, which fosters self-awareness, self-management and attunes our guiding values (2) other-focus, which fosters empathic-awareness, and (3) outer-focus, which fosters external systems awareness. Arguably, a designer can greatly impact participatory states of mind.

Cooke (2001) refers to the role of the facilitator in participation as the *interventionist*. He explains:

> *There is nothing in participatory processes themselves that brings about a particular state of consciousness; rather, that state is shaped by the interventionist. (ibid, p120)*

This seemingly strong influence presents an opportunity for design to set a cohesive tone through mindfulness as opposed to a potentially coercive one through egotism.

Based on the preceding review and analysis, openness is described as receptivity to dynamic multiple perspectives to support visibility of interconnectedness in external and internal systems. It is suggested here that co-creative external systems views (that consider natural and social communities), should be complemented with reflective spaces that promote internal systems views (in order to include the diverse facets of the self as a system of interconnected aspects). In such a reflective space, designers can potentially know more to consider more, and learn to 'respond adaptively to situations rather than automatically, and on impulse' (Hart et al., 2013, p28).

Scharmer (2014) contends that collective mindfulness is the way to overcome the collective sleepwalking that causes the collective creation of results that nobody wants. It would be reasonable to assert that the benefits of mindfulness are broadly favourable to design in the contexts of:

- innovation, through benefits like openness to multiple perspectives, and to the unfolding of possibilities potentially enhancing originality and creativity; and
- equanimity and collaboration, as the arising ecocentric and socially favourable human qualities potentially enrich interpersonal relationships in social interaction.

2.5 Mindful Design

The concept of mindful design was introduced by Niedderer (2013) to 'describe how design objects can be designed to facilitate mindful attention of the physical and social actions within which they are used and of the consequences of these actions' (p7). This view frames mindful design in relation to existing approaches of design for behaviour change and expands the understanding of socio-cognitive mindfulness through modifying expected functions of objects. In this case, awareness is created by the 'physical or symbolic disruption' (p7) of a designed object's function. She explains that:

> *Mindful design facilitates a process of conscious decision making by creating awareness of one's own behaviour and shifting the focus from an external to an internal locus of control through mindful reflection (ibid, p7).*

The way this mindfulness approach adapts its socio-cognitive mindfulness base, is that the unexpected new or omitted feature of the designed object is the cause for the situational change in attention. This mechanism differs from encouraging a voluntary and deliberate engagement with an object of attention, to a disruption in habitual perception through omission of an expected function, or addition of an unexpected one. The suggested mindful driver of superior coordinated performance is a kind of purposeful attention-in-action where each group member is sculpting their individual contribution with autonomy and in new unique ways. Furthermore, socio-cognitive mindfulness techniques aim to encourage the embrace of uncertainty by relabelling absolute truths with probability statements. And

the simple notion of 'noticing new things about each other' suggests improvement in social relationships.

Mindful design is a design approach that moves beyond the techniques and procedures of design and beyond user-centred approaches, in the direction of a more human-centred perspective with a basis on interpersonal responsibility. Niedderer (2004) explains that mindful design considers wider aspects of the practice to include considerations concerning design as a mediator of human interrelatedness. This is a novel outlook on the discernment of design, its motivations, capabilities and competences that she argues should start with a profound view into social life. This concept of design as a social mediator is constructed around a new classification of designed artifacts termed 'performative objects' (Niedderer 2004, 2007). The reasoning underpinning this notion is that mindfulness can be understood as the level of attentiveness that a user can have concerning the social repercussions of the actions performed with said object. Through their function, artifacts can have an effect on behaviour. Mindful design then, aspires to cause mindful disposition in social relationship settings through the design of alternate functions in an object.

The idea of mindful design has further evolved into more broader conceptions. Niedderer (2013) discussed the concept in context with design for behaviour change, and argued that mindful design can 'shift the focus from an external locus of control to internal locus control' (ibid, p1), which 'enables conscious decision making and commitment in the individual as an essential basis for attitude change and for lasting behaviour change' (ibid, p1). More recently, the approach has broadened and developed into a 'mindful interdisciplinary co-design methodology'

(Niedderer et al., 2017, p7). This initiative is about designing for, and with people diagnosed with dementia; and it prioritizes their subjective well-being and self-empowerment in social settings. People with dementia are included in the research and in the design processes; and instead of a 'deficit-oriented' (ibid, p3) perspective, mindful design seeks opportunities and looks at people's potential. Stemming from this initiative, Bosse (2019) and Bosse et al. (2018) apply mindful design as a way to introduce mindfulness into design education. They accomplish this through inclusion of the concept of mindful design as a distinct design approach among others in academic contexts. Also, by developing efficient ways to teach the criteria of the approach as well as the development of a tool to assess whether mindful disposition is caused by objects, artifacts or outcomes, which were designed following mindful design criteria.

The researcher takes the stance that this programme contributes to and expands the application potential of mindful design. At a glance, the previously described evolution of mindful design can initially be understood as design-for-mindfulness, in the sense that the function of a designed artifact is to cause mindfulness. As more applications of mindful design have emerged, it finds embodiments in other design approaches like co-design as well as in design education proper, where teaching of the approach aims to not only educate about its criteria and asses designed objects for their efficiency at causing mindfulness, but also to insert mindfulness in the process of learning design. Consequently, mindful design can also be understood as mindfulness-for-design because it is supporting the experience of mindfulness in the learning and practice of the design process. In this sense, this study is positioned as a suitable application of mindful design, in that it inserts the experience of

mindfulness in the design academic context of student multi-disciplinary design teams, in the processes of education and of research.

2.6 Values and Design

It is important to consider values in context with designing since, as we have seen, they are recognized as impacting design decisions. Strickfaden, Rodgers & Langdon (2006) state that:

> *The development of an artefact is inherently bound up with meanings, relationships, and value systems relative to the individuals creating them, and to the context of their immediate and external environments. (ibid, p1)*

Young, Blair & Cooper (2001) claim that designers need to be mindful of unconscious worldviews and tacit assumptions. Akama (2012) insists that social and cultural values tend to be invisible and yet pervasive within the design process. Lawson (2006) stated that values and beliefs conform a designer's set of guiding principles and that they: influence the mental context and direct the framing of design problems; are at the root of designer's work satisfaction; seem to be associated with a higher level of design expertise; and are often manifested unconsciously. Thus, the potential impact on a designer's awareness of more deliberate mindful activity is in spaces within the design process where values and beliefs held can be made visible and explicit, arguably transforming the embedded tendencies arising as *metic* intelligence.

Considering that *metic* tendencies surface as a knowing-in-practice associated with the flow of designing, and that they are driven by a foundation of automatic emerging values and beliefs that impact design choices, then, as discussed, at that point the degree of moral and relational tendencies is likely pre-determined. These embedded values

must also be invisibly present at other times in the framing of the design problem where relevant information (including information on how not to impact the world in a negative way) is obtainable. Yet, the fact that the information is available does not mean that the information is considered. Martínez (2015) found that design students did not consider sustainability impact information unless pre-established moments of reflection were planned. This implication is important because it indicates that to enter into any discernment upon what the value choice may be for the designer, or how not to impact the world in a negative way, there appears to be a need to create reflective spaces to engender receptivity to such information. From Martinez's findings it can be inferred that designers tend to act based upon unconscious values and beliefs held, influenced by factors such as the internal/external dilemmas of 'wills' associated with the immediacy of expectations of the design problem brief (Inácio & Gerardo, 2006). Arguably, this leaves any socially innovative, sustainable or moral tendencies, invisible.

The judgment upon what is moral is a complex inquiry that can lead to abstraction of values and imposition of ideologies (Akama, 2012). In the view of Inácio & Gerardo (2006) ideally, the enlightened designer would make well-informed formations of intentions and decisions on the best course of action and would act accordingly. But what is the best course of action? Ethics are not in our biology (Dilnot, 2010), and ethical decisions in the professional realm are influenced by diverse factors, one of which is changes and variations in cultural values and beliefs (Gardner, Csikszentmihalyi & Damon, 2001).

Within the framework of mindfulness, this document explores an alternate, more timeless view to moral awareness, the subjective experience of

interconnectedness. Siegel (2012) explains that moral imagination and behaviour arise from the subjective experience of interconnectedness. This refers to the experience of meaningful connections with other people, communities, places or concepts. It is an understanding that arises from systems thinking perspectives of an experienced sense of closeness as opposed to a rational view. Moreover, this also refers to the subjective experience and definition of the self. The self is 'in scientific fact, both an embodied and a relational process' (ibid, p390). Similarly, in the context of the traditional view of mindfulness, Nhat Hanh (1975) explains that contemplation on interdependence is one of the ways to arrive at liberation from narrow views. He urges a recall of an ancient truth:

> *[T]he subject of knowledge cannot exist independently from the object of knowledge … When the object of knowledge (the something) is not present, there can be no subject of knowledge. The practitioner meditates on mind and, by so doing, is able to see the interdependence of the subject of knowledge and the object of knowledge. (ibid, p45)*

Values are important in design as well as in other fields. Goleman (2013) says that inner focus attunes us to our guiding values. Langer (2014) asserts that values create a context that influences sense perceptions. Schon (1987) points to the dissatisfaction of failing to recognize and respond to one's own value conflicts. Young et al. (2001) speak of the challenge of realigning designers' values for the benefit of future generations. Lawson (1997) states that design inevitably involves subjective value judgement and explains that questions about which are the most important problems, and which solutions most successfully resolve those problems, are value laden. He further describes 'guiding

principles' as operating ideas, beliefs and values that develop over a Design career. Akama (2008) found that values emerge and are inscribed in designers' practices, yet also that to be able to become reflective of the values of others it is necessary to be self-aware of one's own.

Schön (1987) explains that when professionals fail to recognize or respond to value conflicts, violate their own ethical standards, fall short of self-created expectations for expert performance, or seem blind to public problems they have helped to create, they are increasingly subject to expressions of disapproval and dissatisfaction. Lawson (2006) states that design inevitably involves subjective value judgement and explains that questions about which are the most important problems, and which solutions most successfully resolve those problems, are often value laden. He further suggests that designers may be seen to prescribe and to create the future, and thus their process deserves not just ethical but also moral scrutiny.

Inácio & Gerardo (2006) illustrate clearly the moral dilemma faced by the design practitioner by differentiating between application of a *better* action to support the demands of a design problem, and the *moral* action which could, upon analysis, be obviously beneficial to a larger good. They establish that the designer can only be *akratic* in almost every action and define akrasia as incontinence in moral actions. This could be also understood as acting in a way contrary to one's sincerely held moral values. Furthermore, they utilize an argument around the design of a table of torture as an experience of thought. The *better* action is a design that considers 'construction with resistant and beautiful materials, with an enhancement of the tormentor usability, inflicting the most possible amount of pain to the victim without letting him pass out (ibid). The 'moral

action' in this case is obviously not to commission such a project. Of course, our day-to-day moral decisions may not be so extreme and can have wide room for moral opinion and debate. An example that is more accessible is the one where they describe a graphic designer's decision between the uses of sustainable paper as a *moral* action as opposed to non-sustainable paper as a *better* action because it will grant better results. The pragmatism that is inherent to the striving for subsistence of course has an impact on a designers' dilemma of balancing values with actions. Inácio & Gerardo refer to this as dilemmas of two wills, the internal and external dilemmas of the designer.

In the internal dilemma, the designer could be confronted with two wills, between reason and pathos; both interfere with the internal rational capacity of creating intentions. In pathos we can subdivide it in two categories: first, is what we may call immediate necessity, the basic needs of the quotidian, like the necessity to earn a living, to eat, to have a job, etc; second, what we may call of *pathos mania*, or *self-indulgence*, the need of recognition and ambition, to excel in the *better* action. In the external dilemma there is the will of the designer and the will of another agent exterior to himself. In this case the will of the client. (Inácio & Gerardo 2006)

To avoid a general assumption of what is or is not universally moral, it is important that within the scope of this document, values are considered very individual and defined only by what the designer holds to be meaningful and dear. Having said that, it could be argued that the promotion of valuable human qualities such as compassion, empathy and ecocentrism, could make for a purposeful aspiration to establish

worthwhile common ground in the experience of design practice value choices. In this light, theoretical arguments are raised to suggest:

- that values and beliefs drive automatic, under-regulated perception systems, which are the foundation of design choices made; and
- that mindful and mindless states of mind operate in tandem during designing through a simultaneous emergence of knowledge and an arising of insight.

These creative moments, often associated with concepts like flow and reflection-in-action, are largely non-analytical, thus arguably making any behavioural tendency, pre-determined.

Having established the importance of values in design, they were deemed a suitable design-relevant object of observation to integrate in the function of the *mindful design device*.

2.7 The Mindful Design Device

In alignment with the researcher's motivations in undertaking this study, this review has explored the connections between 'being': a designer's meaningful values; and 'doing': the practise of designing. Design outcomes are largely influenced by the degree of intersection between:

- a designer's set of evolving values and world views; and
- a designer's behaviour and actions.

This tension between a project's purpose and reach, and a designer's values and principles are important to design.

As discussed in this review, mindfulness, as a disciplined practice based on eastern philosophy, leading to certain mind states or attitudes, and its resulting physiological and psychological effects is currently widely discussed in research literature as well as in mainstream media. It can be viewed as ways to train the mind to focus attention in particular ways (Siegel, 2010; 2012), and thus encourage decision-making to be less automatic, or less mindless (Langer, 2014). Overviews of the varied descriptions and research streams around the concept, as well as critical analysis of the interrelationships between aspects of mindfulness and of design have been discussed in depth. Approaches to mindfulness were analysed and explored in an effort to adapt and integrate a form of the discipline to design contexts.

The researcher explored early draft iterations of the *mindful design device* in collaboration with master level collaborative design student teams. Whilst these preliminary versions of the mindfulness-based tool did not conform the final research study design of this programme, there were

some useful developments that helped integrate aspects of it to the course curriculum, as well as derivations of it supporting research in its embodiment as a 'Dynamic Stakeholder Tool' (Sterling et al., 2018, p7). Appendix G contains detailed descriptions and examples.

The study's final version of the *mindful design device* follows a perspective that suggests that mindful qualities of attention emerge out of intrapersonal attuning of individuals to permeate relational contexts and foster interpersonal benefits (Siegel, 2007; 2009; 2012; Parker, Nelson, Epel & Siegel, 2015).

2.7.1 The Eight Sense

Siegel (2010; 2012) devised the concept of *The Wheel of Awareness* (Figure 1) as a form of mindfulness that fosters intrapersonal attuning; a process that trains the mind to recognise and differentiate amongst diverse elements of self-perception the sense of knowing from the sense of that which is known. Another way to explain it is to view the individual self as a system and recognize the individualities that differentiate an *observing self* (Deikman, 1982) from the object(s) of observation. From a systems perspective, upon differentiation then comes 'linking' which is a task of acknowledging the relations between the objects of perception and of the observing entity as parts forming a complex whole.

In the original *Wheel of Awareness* mindfulness exercise, the objects of observation are described as 'senses':

- the five senses (sight, hearing, olfaction, taste, and touch);
- the sixth sense or interoception (perception of the interior of the body);

- the seventh sense (thoughts, emotions, attitudes, beliefs);
- the eighth or relational sense (sensations of our connections with others).

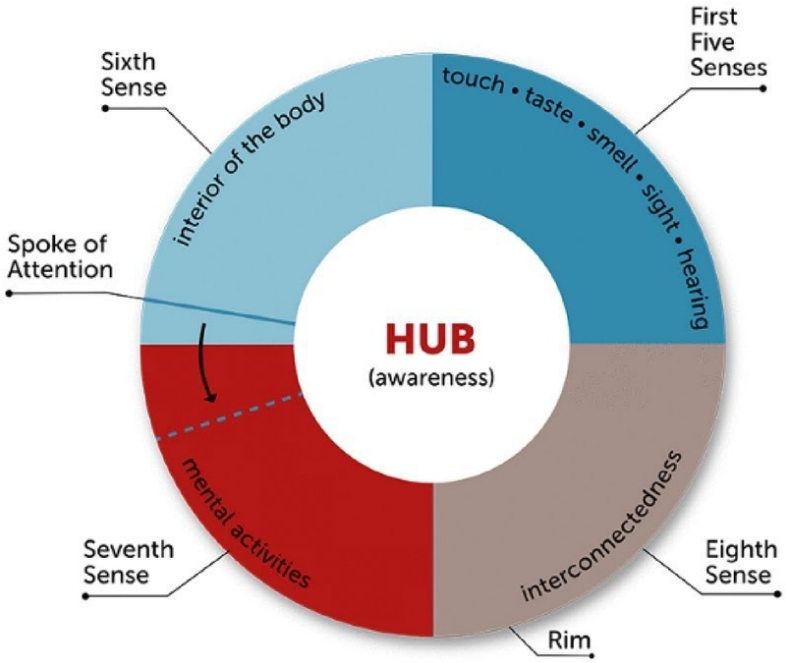

Figure 1. The Wheel of Awareness. 'The hub represents the experience of awareness itself — knowing — while the rim contains all the points of anything we can become aware of, that which is known to us. We can send a spoke out to the rim to focus our attention on one point or another on the rim. In this way, the wheel of awareness becomes a visual metaphor for the integration of consciousness as we differentiate rim-elements and hub-awareness from each other and link them with our focus of attention' (Siegel, 2016).

Siegel proposes that this practice promotes consciousness integration and defines it as the linkage of differentiated parts of a complex system. In his view, non-integrated complex systems can lead to chaos, rigidity or both. In an integrated system, subsets of a collection of elements become unique (or specialized) in their individuality and then interact with each

other to form a complex whole. This may lead to self-organization as an emergent property of the interactions of elements of the system. Finally, the functions of the elements are influenced by the emergent self-organization moving the system towards maximizing complexity, or to harmonious interaction of unique elements (ibid). In the context of mindfulness, and of considering the self as a system, differentiation of discrete kinds of contents of the mind is activated by focused attention, linking an *observing self* with an experiencing-self, and leading to internal (or intrapersonal) and interpersonal attuning. Siegel explains:

> *Sensing the inner states of mind of another alters our own inner state. Therefore, looking toward our own inner world serves as the source of empathy for others' mental experience. Hence, reflection is both an inner and interpersonal gateway to insight, compassion, and empathy (ibid, p490).*

In order to make the device relevant to design, the objects of observation are focused on the *eight* relational sense and substituted for those that are thought to impact design choices: embedded personal and professional values and beliefs, and their relational roles. This is rooted on the notion that most mental information processing is automatic (mindless) and that it's influenced by these values and beliefs held (Kahneman, 2011). A designer's set of personal and professional values and beliefs are considered important to the process of design, are said to emerge unconsciously, to impact, and to direct the framing of design problems (Akama, 2012; Lawson, 1997; Strickfaden, Rodgers & Langdon, 2006; Young, Blair & Cooper, 2001).

Upon engagement with the device, participants are encouraged to differentiate what seems important at the time of reflection and to assign those values to a role or self-aspect (McConnell, 2011) that is prevalent in their personal and/or professional realms. Capra & Luisi (2014) propose that diverse individual inner conceptions of the self are real and yet, are not separate entities. They frame this around a systems understanding of life, as an inner world of reflective consciousness containing a multitude of interrelated characteristics (ibid, p304).

Conceivably, this process promotes a sense of interconnectedness where, like Siegel (2012) proposes, whilst some of the identities in an individual may have seemingly contradicting values, they are inherently part of the same complex self-system.

It is important to highlight that all of the roles we perceive ourselves to play in different aspects of our lives, are a function of a relationship with something or someone. Thus, the *mindful design device* is in fact explicitly inviting awareness of, not just values and beliefs which are suggested to impact design decisions, but also the roles played in different relationships. In this light, the *mindful design device* is a practice that focuses on the eighth or relational sense to inform about designers' motivations and to raise awareness of social roles and interaction.

2.7.2 Structure of the Mindful Design Device

As it has been explained, this study's intervention was designed to embody literature-supported aspects of mindfulness by encouraging heightened awareness, through a practise of consciousness integration of multiple inner self and relational perspectives in a design-relevant context.

Design relevance is ensured where:

- the objects of attention are designers' personal and professional values, which are suggested to impact design decisions, and their relational roles; and
- a direct correlation exists into concerns of collaborative design in that according to mindfulness literature, the intrapersonal process of consciousness integration can potentially enhance interpersonal skills in social interaction.

The *mindful design device* as a method to capture unique data is also an important contribution of this study. A comprehensive system was developed around the tool to:

- induct participants;
- support their reflective process over the study period; and
- capture the data efficiently for analysis.

Induction consisted of a brief overview of an understanding of mindfulness and in a general way, its potential benefits to design concerns as described in this literature review. This initial orientation was intended to spark interest and offer initial support to the intended iterative nature of the tool. Participants are asked to find a time every day to reflect. Since this is a new practise that aims to be inserted in a daily schedule, it was suggested that reflection times be attached to an existing daily discipline (i.e. before or after a meal, or upon arrival to/from school or work, or before going to bed, etc.). This is followed by a thorough walk-through of the process of engagement with the tool and an explanation on how occasional nudges would be sent over a private group in a social media platform to serve as a reminder and/or additional encouragement. Nudges

are short messages which aim to clarify further some of the concepts explained and/or offer tips to help construct a continued discipline of engagement with the tool. An example of a nudge to serve as a reminder over a weekend reads as follows:

> *'Hello all. As the weekend begins, it is possible that some routines vary. Stay aware of how you are relating to the practise. It is possible that, at one end, you are engaging deeply with the practise some days, and maybe others it is lighter. Remember what's important is to sustain the discipline and all engagements, deep or light, are valuable. Have a great weekend!'.*

In order for the inner inquiry to inform about a designer's personal and professional values in a mindfulness-based way, three important perception elements compose the internal observation process:

- The Observing Self;
- Roles, (Identities, or Selves); and
- Values.

The way the participants perform their self-inquiry and submit the product of their mindful reflection, in consideration of those three elements, was designed to ensure that the data was properly contextualized and submitted in an efficient way in the form of *a priori* coding for appropriate analysis (see Section 3.6).

The concept of the *observing self* (Deikman, 1982; Shapiro et. al, 2006; Siegel, 2010; 2012; 2016) is a mindful way of paying attention in which one aims to differentiate the experience of awareness itself from the object of attention one can become aware of. Mindfulness literature highlights the

benefits of this attentional shift by differentiating the act of observing the contents of consciousness from being unconsciously embedded or fused with such content (Shapiro et al., 2006).

An *observing self* can be understood as the self, or the perspective from which one is able to view our other diverse roles in life from a metaphoric *outside*. Selves are the diverse roles or identities in a person's life such as designer, sister or friend.

Psychology research literature explores the concept of the self as constituted by multiple selves (Higgins, 1987; Markus & Nurius, 1986; Roberts & Donahue, 1994). McConnell (2011) advanced a comprehensive framework that aimed to organise the diverse aspects of the self and highlight how context-dependent selves guide experience and behaviour.

He proposes five principles of the self:

- The self is a collection of multiple, context-dependent self-aspects.
- Self-aspects are associated with personal attributes, which become more accessible when the self-aspect is activated and vice versa.
- Overall affect reflects the evaluation of one's self-aspects weighted by their accessibility, and thus feedback about a self-aspect will affect general affective states to the extent that the information has implications for one's evaluation of that self-aspect.
- Feedback about a self-aspect influences evaluation of other self-aspects that share greater attribute associations.
- The impact of information pertaining to a specific attribute on overall affect increases as the number of self-aspects associated with the attribute increases.

These selves, or self-aspects capture a person's roles, goals, private and public selves and relational and collective identities (ibid). Capra & Luisi (2014) propose a similar view in that multiple self-conceptions are real and yet, are part of the same individual. They adopt a systems view and describe the self as an inner world of reflective consciousness that contains a multitude of interrelated characteristics.

Finally, an understanding of the term values was considered important in order to have a clear focus of how submissions would be treated in data analysis. Schwartz and Bilsky (1987; 1990) proposed the following definition of values that incorporates five features of values recognized in literature:

- Values are concepts or beliefs.
- Values pertain to desirable end states or behaviours.
- Values transcend specific situations.
- Values guide selection or evaluation of behaviour and events.
- Values are ordered by relative importance.

In addition to these, they also suggested that important aspects of values are the type of goal or motivational concern that they express. Values are also described more simply as desirable modes of conduct (or attributes); or as preferred end-states, (or aspirations), by Almond & Wilson (1988) and Rokeach (1973). This programme adopted a focused definition based on the aforementioned descriptions and their relevance to design. Thus, in context with this study's focus, values are understood as:

- personal and professional attributes, and/or
- personal and professional aspirations.

2.7.3 Engaging with the Mindful Design Device

The process starts with an invitation to begin the reflection from the participant's perception of their own *observing self,* followed by a minimum of two (2) introspective questions cycles. From that base, then the participant is asked to view their role as designer and determine what seems important at that very moment, from the perspective of said role. This constitutes a designer's meaningful motivational goal, principle, or 'Value'. The result of the reflection is arrived at following the first question:

> *'WHAT SEEMS IMPORTANT NOW FROM THE PERSPECTIVE OF MY ROLE AS DESIGNER?'*

Then there is an instruction to 'PAUSE' and wait for the answer to come on its own as a deliberate attempt to begin to cultivate the skill of receptivity or openness to arising insight. The second question comes after an invitation to return to the participant's understanding of their *observing self*. It is an important step because it offers again the opportunity to have the experience of viewing life's roles from an 'outside' perspective, thus highlighting the potential of recognising that the essence of an individual is that of an interrelated system of Selves. This next question does not require the new inquiry to be from the perspective of the role of designer (although it could). Instead it leaves it open to assign the 'Value' to any other personal or professional role in the following way:

> *'WHAT ELSE SEEMS IMPORTANT NOW FROM THE PERSPECTIVE OF ANY OF MY OTHER ROLES IN LIFE?'*

Again 'PAUSE' and wait for the answer.

A one-word value (commitment, fairness, timeliness) is asked of the participants to represent the answer to what is important, along with the role that it belongs to. Through this precoded output, value context was enhanced so as to, for example, be able to differentiate nuances like the COMMITMENT of a HUSBAND from the COMMITMENT of a CYCLIST. Paper-5 explains the significance of this process in the following way:

> *'This reflection content offers insight on what participants discern to be significant in their perception as they move between their designing role and other life identities. As a mindfulness exercise, the activity promotes recognition and differentiation of the knower (the observing self) from the known (the Object of Observation). Relevance to design is accomplished by making the objects of observation to be elements that impact design choices: personal and professional values and beliefs. Starting from their understanding of what the experience of the observing self is, potentially promotes a reflective process that encourages points of view that are not habitual. Waiting to see what arises as important, creates a mental space between the question and the next emerging thought. And matching the value to a personal or professional role that they perceive it belongs to, offers an experience opportunity of recognition of a self with a multitude of interrelated aspects.' (Rojas, et. al, 2017, p8)*

A system utilising Google Docs® was devised for submission and collection of the data, as well as to offer additional support documents to participants. Instructions and the capability of submission for the daily engagement tool were distributed to participants through a link pointing to

a web-based Google Form®[1]. This form contained a brief introduction about the engagement and the general purpose of the study that reads as follows:

> *Use this form to submit your results each time you complete your reflective exercise. The process is explained below in two simple steps. Whilst it varies, it usually takes between 2 and 4 minutes to complete. It is suggested that this reflection is carried out often and continuously during the period of the study (approximately six weeks). Often, to help create discipline, it is useful to attach this practise to another habitual part of your day (i.e. after brushing your teeth). At minimum, this engagement should happen daily or almost daily, but you are welcome to engage with this as often as your time and comfort allows. Since this can be done from any mobile device, some people find it useful to undertake the practise at idle times (i.e. waiting for the train).*
>
> *In this engagement we are exploring a method to cultivate the skill of mindful awareness which is believed to be important for design. It can be described as: an openness or receptivity to multiple perspectives. Science suggests that a way to develop this competence is by exploring the multiple aspects which make up our perception of ourselves. In this case, the aspects of our perception that will be explored are personal and professional values and roles, which are believed to impact design decisions.*

[1] Mindful Reflection Form (n.d.). Retrieved from https://goo.gl/forms/f9if7kEjrmamTDlF3

The form also contains an optional link[2] to a Google Slides® support document that explains again, in presentation form, the steps for daily engagement. The reflection content offers insight on what participants discern to be significant in their perception as they move between their designing role and other life identities. As a mindfulness exercise, the activity promotes recognition and differentiation of the knower (the *observing self*) from the known (the *object of observation*). Relevance to design is accomplished by making the objects of observation to be elements that impact design choices: personal and professional values and beliefs.

Starting from their understanding of what the experience of the *observing self* is, potentially promotes a reflective process that encourages points of view that are not habitual. Waiting to see what arises as important, creates a mental space between the question and the next emerging thought. And matching the value to a personal or professional role that they perceive it belongs to, offers an experienced opportunity of recognition of a self with a multitude of interrelated relational aspects.

[2] Daily Mindful Reflection Presentation Slides (n.d.) Retrieved from https://docs.google.com/presentation/d/1Ow3KD6txTn4euKCjKLhBBw6wpQaDxUcjqfRGRdw1TQE/edit#slide=id.g20b6a1876d_0_81

Table 1. Mindful Design Device in Brief

Figure 2. Mindful Design Device Step 1: A *self* is understood as a role or identity. Start with an *observing self* node and split it in two categories: Personal and Professional. The *observing self* represents the entity from where you are able to see your other roles. For example, you can identify one of your Professional Selves as a Design Team Member; and a Personal Self as a Cycling Enthusiast. And you can observe both from your *observing self* role.

Figure 3. Mindful Design Device Step 2: Bring your awareness to your *observing*

self role and ask yourself: What seems important now (to either a personal or professional self)? See what arises. There are no wrong answers. For example, let's say your first thought was: "I'm concerned that the due date is approaching and we need to finish the concept". Now select a self, or role or identity in your life you think this can belong to. For instance, this particular concern can belong to a Design Team Member Self, which is a Professional Self.

Figure 4. Mindful Design Device Step 3: Now decide what value you think this first concern belongs to. It may help to consider it as “an appreciation for...” or “a belief in...”. In this example Timeliness was chosen. Choose a value you are comfortable describing. Again, there are no wrong answers. Since this is a daily exercise, it is possible that values might refine overtime. Go back to your *observing self* role and ask yourself the question again: What else seems important now? See what arises.

Figure 5. Mindful Design Device Step 4: It is up to you to discover which Self and which Value, your next thought belongs to. In this example, for illustration purposes, Cycling was chosen as the Self (personal) to which the second thought or concern belongs to. And the value, Discipline. This is assuming you were a cycling enthusiast and your next thought was about keeping up with your training.

2.8 Research Questions

From the preceding literature review, two research questions emerged that guided this study's data analysis. This section describes the final formation of the research questions stemming from the literature review. The initial aspired contributions of this programme have been to:

- Propose a description of the concept of mindfulness as it relates to design concerns.
- Develop and implement a design-relevant mindfulness-based intervention (also referred-to in this study as a *mindful design device*).

In order to begin exploring such possibilities, two main research questions were developed to underpin this study's research design:

- RQ1: *How is mindfulness understood in design literature?*
- RQ2: *How can a mindfulness-based intervention be relevant to design?*

This chapter's literature review answers this programme's basic research questions resulting in the identification and analysis of intersections between mindfulness and design. Thus, a literature-supported design-relevant mindfulness-based intervention was developed and described. Two more research questions emerged stemming from this critical analysis after having established the following premises:

- that designers' personal and professional values are viable objects of mindful attention relevant to design; and
- that improved interpersonal relationships are both, a suggested mindfulness benefit, as well as an area of opportunity for contribution in contemporary collaborative design contexts.

The two additional emerging research questions are:

- RQ3: *What kinds of personal and professional values arise upon mindful reflection in context with collaborative design?*
- RQ4: *Does engagement with the mindful design device have an enhancing effect on designers' interpersonal relationships?*

In this light, the following opportunities surface and can help to expand the scope of this study's contributions:

- To describe the *mindful design device's* potential in generating rich unique data that helps to inform about designers' evolving personal and professional values.
- To propose a qualitative categorisation method of designers' evolving personal and professional values.
- To report on the perceived mindfulness effects that designers reveal about their interpersonal relationships upon engagement with the *mindful design device*.

Chapter 3
METHODOLOGY

Contents

3.1 Introduction

Chapter 2 answered two initial research questions:

- RQ1: *How is mindfulness understood and described in design literature?* This undertaking illuminated some of the ways the term mindfulness is brought to bear in design academic discussions.
- RQ2: *How can a mindfulness intervention be relevant to design?* A way to understand it was constructed through a review of mindfulness academic and traditional literature, and by critical analysis of intersections with design. Upon reaching such understanding, a *mindful design device* was designed considering relevant aspects of mindfulness and of design.

Out of the critical analysis stemming from those two original questions, two more research questions arise:

- RQ3: *What kinds of personal and professional values arise upon mindful reflection in context with collaborative design?*
- RQ4: *Does engagement with the mindful design device have an enhancing effect on designers' interpersonal relationships?*

This chapter addresses the rationale behind the methodology that was implemented to answer these questions. To this end, design and social science research traditions are discussed; a suitable research methodology strategy is established; and finally, the processes of analysis and findings are detailed.

The critical literature review on Chapter 2 also established that mindfulness is of interest to design and that, as a concept, it is considered important, especially in contemporary design applications which

emphasize collaboration and participation. Moreover, the potential benefits of mindfulness, in the form of intrapersonal inquiry (see section 2.7), towards the enhancement of interpersonal relationships is particularly pertinent to such cooperative design approaches. In spite of this, there has not been an explicit attempt to introduce a mindfulness intervention into a design setting, and at that, one that has direct relevance to a particular design context. Relevancy of the designed intervention in this study is justified by identifying and using as inspiration the concept of design Guiding Principles and the importance of values in design. Designers' values are established as a fitting object of mindful observation and the resulting mindful reflective output is established as data. Furthermore, as discussed in Chapter 2, science suggests that there is a direct correlation of mindfulness to concerns of collaborative design in that, according to literature, the intrapersonal process of consciousness integration can lead to enhanced interpersonal relationships.

In this light, personal and professional values, which are believed to impact design decisions, can potentially be brought to the fore through mindfulness practice, and inform, through data analysis of the reflective output, about what motivates designers in particular contexts; in this case, collaborative design education. Stemming from literature analysis this study defines design values in two dimensions:

- as designers' personal and professional attributes; and
- as designers' personal and professional aspirations.

Moreover, to explore the possible effects of engagement with the *mindful design device* in designers' interpersonal relationships, a final reflection survey was administered to participants at the end of the study period.

3.2 Research Questions

The general aim for this study is to make mindfulness explicit in a design education setting by developing, implementing and assessing the impact of a design-relevant mindfulness intervention. The features of this intervention led to two focused aims:

- to increase our understanding of designers' evolving personal and professional values impacting design decisions, through the implementation of a design-relevant mindfulness-based intervention, or *mindful design device*; and
- to assess whether engagement with the *mindful design device* advances interpersonal benefits in collaborative design contexts.

The main research questions that underpin the research design are:

- RQ1: How is mindfulness understood in design literature?
- RQ2: How can a mindfulness intervention be relevant to design?

The literature review on Chapter 2 answered the preceding questions and from that critical analysis two more questions emerge:

- RQ3: *What kinds of personal and professional values arise upon mindful reflection in context with collaborative design?*
- RQ4: *Does engagement with the mindful design device have an enhancing effect on designers' interpersonal relationships?*

The methodology employed for this study is described in this chapter following an overview of the context in which this program stands and how this contribution fits within design and social research. It is important, since this programme is framed within the design field, that it is clear where it fits

within research philosophy, the various design research modes, and within social research in which much of design research is based.

3.3 Design & Social Research

This research programme adopts a Constructivist philosophical stance, with a qualitative research methodology. This is supported by a multiple-case study structure in order to:

- develop theoretical categories of designers' evolving personal and professional values; and
- report on designers' perceptions about the potential enhancement of their interpersonal relationships upon engagement with the *mindful design device*.

Constructivism (Young and Collin, 2004), is a research perspective that asserts that reality is constructed by the way people perceive and assign meaning to it. This is in opposition to the perspective of Positivism, which contends that reality is objective and concrete, and that scientific methods help us understand it (Lynch and Bogen, 1997). The Constructivist paradigm argues that researchers should embrace an exploratory mindset (Patton, 2002), and investigate how participants construct their beliefs in a social context (Guba and Lincoln, 1994).

The development of design research is fairly recent. Academic texts point to its beginnings around the 1960s when interest in the science of design processes was developing (Gregory, 1966; Simon, 1969). The initial and subsequent discussions explore aspects of the science of design as: design based on scientific knowledge; the systematic knowledge of design processes and methodologies; the technological foundations of designed artefacts; and ultimately the reference of design as a scientific undertaking in and of itself (Cross, 2000; 2001). Spencer (2008) establishes a distinction in the use of the terms Science and design, where Science of

design can be referred-to as the study of principles, practices and procedures of design, and where design Science can be understood as the development of a body of knowledge that improves our understanding of design utilizing scientific methods of inquiry.

Yee (2006) explains that design research went through a paradigm shift from a positivistic philosophy of an objectively correct design method, to a relativistic point of view. This new perspective contested the early viewpoint of design problems as objective and well-formed (Simon, 1969), and considered the uncertain, unstable, unique and value-conflicted nature of design problems (Schon, 1983). In the 1990s, design research projects were described, and their characteristics refined in order to define it as a discipline separate from the known scientific methods. Frayling (1993) classified Art and design research projects as research into, through and for the purposes of Art and design; and Archer (1995) described them as about, through and for the purposes of practice.

These classifications described the study of design activity where either:

- the practice is the focus of the study;
- the practice itself is the research method as well as the result of the study; or
- a designed object is the product of the research.

Some authors (Sevaldson, 2010; Steinø and Markussen, 2011) aimed to refine these groupings and suggested that design research should communicate knowledge that pertains specifically to design practice. Steinø and Markussen (2011) propose four categories based on the kinds of questions design research deals with:

- ontological, about what design is and what it is good for;

- epistemological, about how to know about design and how to perform design;
- contextual, about the interaction of design with people, cultures and social systems; and
- procedural, about the tools, techniques and procedures to execute design.

Whilst present-day design research integrates scientific and social science methods, Yee (2006) contends that it focuses more on the process and practice of design with an emphasis on human values and issues. She cites a view by Mitchell (1993) suggesting that design methods should be user-centred to examine the experience of users as opposed to the designed product. This must be expanded as new participatory and collaborative design approaches emerge and design outcomes involve, not just designed artefacts, but also services and processes. Furthermore, literature suggests that designers are part of the design space (English, 2008; Spencer, 2008) and thus, their experience along with that of other stakeholders, needs to be considered.

This study contributes to design research that deals with procedural questions specific to contemporary approaches of collaborative design. The aspect of design execution that is relevant to this programme is the exploration of mindfulness as a potential new skill in evolving multidisciplinary, multi-stakeholder co-creative applications of design thinking. The aspects of this programme that are relevant to design research are: a mindfulness-based method to generate unique design-relevant data; and an assessment of the potential impact on designers' interpersonal concerns. As reviewed in Chapter 2, mindfulness is considered in design literature as a competency that should be made more

explicit in contemporary design educational contexts that require new kinds of skill sets (Howard & Melles, 2011; Owen, 2007; Norman, 2010; Young, 2012).

In line with relativistic views that prioritize human values and issues in design research, this study embraces social science methods and qualitative data. Ponterotto and Grieger (1999) suggest that qualitative data is descriptive, consists of multiple realities, it's socially constructed and also context dependent; and that qualitative methodology is inductive which means that it aims to seek and to generate theory. To ensure scientific rigour, Robson (2002) maintains that it should be systematic, sceptical and ethical.

Social science qualitative approaches describe the intention of the research, the role of the researcher, the stages of the research, and the data analysis method. Some of the major qualitative research approaches explored for this study were ethnography, phenomenology, grounded theory and thematic analysis.

Ethnography is associated largely with the field of Anthropology. Its emphasis is the study of a group's culture. Originally this referred to ethnic or geographical interests, but it has widened to consider the 'culture' of any particular group. Commonly, an ethnographer records field notes whilst immersed in the culture through what is known as participant observation. When observing people, ethnographers only watch what they do, and listen to what they say without inquiring into their views, feelings or attitudes (Robson, 2002). This kind of research takes place in real settings for prolonged periods of time, as opposed to controlled, artificial environments. Such a method is not suitable for this programme because

this study's data consists of reflective perceptions of the participants' own internal perspectives.

Phenomenology is concerned with people's subjective experience of the world. This is also referred to as phenomenal experience, and as a research approach it has the intention of discovering the essence of contexts such as the experience of emotional states, or the descriptions of what it is like to undergo certain experiences (Stevens, 2000). It is generally associated with social research disciplines such as psychology, sociology and social work. One of the ways phenomenology is implemented in order to derive knowledge, is by subjects performing what is known as 'epoché' (Moustakas, 1994).

This is, incidentally, a state of mind akin to mindfulness, in which participants are supposed to attain a state of consciousness where they can witness events as if it was being observed for the first time (ibid). Spencer (2008) raises questions about the ability of participants to reach such a state of mind at will, and of the ability of the researcher to determine whether such a state has been achieved. Whilst this programme implements a mindfulness intervention that potentially can assist in the development of such a skill, it does not require assessment or attainment of any degree of mindfulness disposition, nor the considerable direct engagement with subjects necessary in phenomenology in order to generate the data. In light of this, phenomenology is not suitable.

Thematic Coding, understood in this study as a form of thematic analysis (TA), was determined to be suitable in this programme largely due to its flexibility to embrace various qualitative possibilities. Braun & Clarke (2017) distinguish that TA is a method, and as such it is a useful tool or

technique that is unconstrained by theoretical obligations; rather than a methodology, which responds to and is more limited by theoretical frameworks (ibid). Braun, Clarke, Hayfield & Terry (2018) understand TA as an umbrella term that includes different approaches to identifying themes in qualitative datasets. Given (2014) characterises it as a descriptive strategy to reduce and categorise data. thematic coding is then described by her as the actual process by which the data is categorised in TA. Braun & Clarke (2019) view thematic coding more as a comparable approach to one of several possible TA applications or 'schools' (Braun et. al, 2018). According to Rivas (2018) categories developed with thematic coding decrease the magnitude of the initial raw data in order to aid more digestible sense making. As far as its application, thematic coding is considered by Maxwell & Chmiel (2014) as a categorising method that can have both inductive and *a priori* possibilities. These are compatible with the varied qualitative tools and techniques implemented in this study's research design, and which are explained in detail later in this chapter. A unique aspect about thematic coding is that it incorporates grounded theory (GT) techniques along with other qualitative methods (Maxwell & Chmiel, 2014; Rivas, 2018; Gibbs, 2007). In light of the above perspectives, this study sought to embrace thematic coding as a categorising method explicitly incorporating GT techniques. Table 2 displays an overview of this study's research design.

Supported by a multiple-case study structure, this research sought to develop theoretical categories to represent designers' evolving personal and professional values; and also, to assess designers' perceptions of impact of the *mindful design device* into their interpersonal relationships. The rationale and description supporting this approach is described in detail in the following sections.

<table>
<tr><td colspan="2">Table 2. Research Design</td></tr>
<tr><td colspan="2">Philosophical Stance: Constructivism</td></tr>
<tr><td>Research Question RQ1</td><td>Research Question RQ2</td></tr>
<tr><td colspan="2">Method: Literature Review</td></tr>
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<tr><td>Research Question RQ3</td><td>Research Question RQ4</td></tr>
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<tr><td>Mindfulness-based Qualitative Survey</td><td>Open-Ended Qualitative Survey</td></tr>
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<tr><td>Development of theoretical categories representing designers' evolving values and of a values framework in a collaborative design context:
First Stage Coding: capture of precoded data.
Second Stage Coding: initial coding to form concepts.
Third Stage Coding: focused coding to form categories.</td><td>Assessment of designers' perception of impact on interpersonal concerns upon engagement with the mindful design device:
Conjecture and refutation for initial categorisation.
Qualitative line-by-line coding for development of themes.
Framing of the data around literature-supported mindfulness effects relevant to design concerns.</td></tr>
</table>

3.4 Case Study Structure

The case study method is considered an appropriate structure supporting a Constructivist paradigm in which truth is relative and subject to one's point of view (Baxter and Jack, 2008). According to Zainal (2007), through a case study structure, a researcher is able to understand behavioural conditions from the point of view of the actors, thus going beyond statistical results. The data stems from a real-life phenomenon and can be closely examined within a specific context. Yin (2003) categorises case studies in three distinct types:

- exploratory,
- descriptive, and
- explanatory.

Exploratory case studies intend to explore a phenomenon in its real-life context. Descriptive case studies intend to describe natural phenomena and the data as it occurs. Explanatory case studies intend to explain the data as it occurs. Regarding the design of the study, Yin states that case studies can be either single or multiple-case, with single (holistic) or multiple (embedded) units of analysis.

The phenomena under study are:

- designers' perceptions of their evolving motivational values arising from engagement with the *mindful design device*; and
- designers' perceptions of impact on their interpersonal relationships upon engagement with the *mindful design device*.

The units of analysis are:

- Designers' evolving personal and professional values defined as attributes and/or aspirations, their occurrence and context, inspired in the theory of design Guiding Principles (Lawson, 2006), and complementary design literature discussing the importance of values in design. For these units of analysis data were gathered by inviting participants to engage with the *mindful design device* and to submit the result of each instance of their intrapersonal inquiries. Personal and professional values are the object of mindful attention. A detailed description of the intervention can be found in Section 2.7, and the way it produces unique and contextual data can be found in Section 3.6.
- Designers' reflections about the perceived effect on their interpersonal relationships upon engagement with the *mindful design device*; supported by science suggesting that enhancement of interpersonal relationships is considered an effect of mindfulness (Siegel, 2010). For this unit of analysis, data were gathered through a final reflection qualitative survey.

There do not appear to be studies in design literature that explicitly develop and directly apply a design-relevant mindfulness-based intervention within a design context. Moreover, this study's results of the mindful inquiry constitute unique qualitative data for analysis. The Researcher argues that there are no known mindfulness-based attempts in design literature that explore designers' evolving personal and professional values in a distinct design context; nor has the potential been considered, that a process like this could begin to expand our understanding of their emergence.

Cases in which theory is the result of the research are known as inductive, and Eisenhardt and Graebner (2007) suggest that in exploratory case studies, induction can build reliable theory. These are contrasted by Bryman (2012) with those known as deductive, where pre-existing theory leads the research. In this light, this research is an exploratory embedded multiple-case study, obtaining data from multiple sources of evidence in order to:

- attain an initial understanding of, and develop theoretical categories around the kinds of designer values that emerge upon engagement with the *mindful design device*;
- assess the potential perceived effects of engagement with the *mindful design device* on designers' interpersonal relationships.

3.5 Qualitative Methods

Rivas (2018) explains that thematic coding, which has also been referred to as Thematic Content Analysis or Qualitative Content Analysis, was part of the momentum that resulted from the interest in legitimizing qualitative research as a viable option. The generation of coded themes in a systematic way helps to support the quality, validity and reliability of a study's findings (ibid). She further suggests that, whilst themes can be descriptive and summarize the data, researchers should move beyond this and consider underlying concepts. Gibbs (2007) makes a similar point suggesting that analysis should be less about descriptions and more about coding that is categorical, analytic and theoretical.

At this point, it is important to settle on the use of some related terms so that the language in this document is clear and consistent. Gibbs (2007) highlights that terms like 'codes', 'indices', 'themes', 'thematic ideas', 'categories' are used in qualitative writing either interchangeably or to mean different things and can often be confusing. This study adopts the view by Maxwell & Chmiel (2014) understanding thematic analysis (TA) as a categorising strategy where data is categorised in order to capture important concepts; and thematic coding as the categorising process under TA where a theme is viewed as a category belonging in the final steps of the coding process that 'is often one with a broader or more abstract scope than those involved in the initial coding of data' (p.7). Also, the language of the analytical process steps also varies. It goes for example, from coding to categories to themes; or sometimes from coding to concepts to categories.

In favour of this document's consistency, and as a relevant way to incorporate grounded theory terms (as explained later in this chapter), the following is adopted: grouping common themes to form concepts; and then similar concepts were organized to form categories.

Maxwell & Chmiel (2014) also discuss several types of coding categories which are useful to classify the data management undertaken in this study. These coding categories help to explore the research question RQ3: *What kinds of personal and professional values arise upon mindful reflection in context with collaborative design?* For this, a mindfulness-based intervention in the form of a qualitative survey, generated rich unique data about designers' personal and professional values. The aforementioned coding categories, along with complementary notions from qualitative research, inform this programme's data management phases, where:

- The data collection phase follows a *pre-structured* or *a priori* emphasis to establish context. This phase implements organizational categories, which are established before data collection and are understood in thematic coding literature as a way to prearrange the data for further analysis (Maxwell & Chmiel, 2014). This is also referenced by Gibbs (2007) as concept-driven coding, where codes may come from deductive sources other than the data. These sources range anywhere from literature on the topic, to the researcher's own intuition. In this study, they are focused on literature-based value definitions, and on participants' value perceptions.
- The data analysis phase follows an *open* emphasis to develop theoretical categories about the kinds of values that arise upon mindful reflection. Theoretical categories seek to go beyond description, consider underlying concepts and position the coded

> data into a comprehensive theoretical framework (Maxwell & Chmiel, 2014). These categories may be developed from existing theory, or as in this study, they are developed inductively from the data (ibid). They represent concepts developed by the researcher from analysis. Gibbs (2007) describes this emphasis as data-driven or open coding.

The category formation process, as outlined in the data management phases, is akin to what Rivas (2018) describes as inductive-deductive thematic analysis. The path from coding to the definition and formation of categories, eventually leads to new theoretical perspectives. She also explains that thematic coding is analogous to the beginning stages of grounded theory but with a focus on theoretical coding instead of on development and generation of theory from the data. Maxwell & Chmiel (2014), Rivas, (2018) and Gibbs, (2007), are advocates of thematic coding and its incorporation of grounded theory (GT) tools and techniques. Gibbs (2007) distinguishes line-by-line coding and constant comparison as singularly worthwhile GT techniques common to thematic coding.

The researcher explored GT techniques in order to accomplish a clear integration of its principles into this study's thematic coding analysis scheme. GT literature suggests that its methods support researchers when they are attempting to codify and publish their own method of qualitative analysis (Glaser and Strauss, 1967). In this instance, where an exploratory qualitative approach seeks to generate theoretical categories, grounded theory (Glaser and Strauss, 1967) techniques were implemented as appropriate under thematic coding guidelines. In one respect, GT is considered a fitting exemplar of induction (Perry, 1998) which supports this study's open emphasis data management phase; and in another, it is by

definition a way to build theoretical analysis through data categorization (Charmaz and Smith, 2003). As GT has developed, some variants have emerged. They can be described as:

- a more structured emphasis (Strauss and Corbin, 1990); and
- more open emphasis (Glaser, 1978).

The structured approach divides the analysis process into set stages that are said to be detailed, formulaic, and a way to force preconceptions. The open approach is flexible, where theory is discovered and developed as opposed to imposed. According to Charmaz (2008) this openness is fostered in Constructivist GT premises which propose that a theoretical framework should not be imposed on the data; and that to create the conditions for emergent inquiry, the GT method should display two properties:

- systematic scrutiny of data; and
- development and checking of categories.

In her view, GT has evolved into many different associated methods as opposed to a single approach. She further suggests that, since its guidelines are few and adaptable, researchers have flexibility to not only choose methods but to create them to fit their inquiry needs (ibid). Following this logic, this study adopts guidelines from GT to support its thematic coding scheme for analysis of the available data for research question RQ3 and thus develop theoretical categories.

To explore research question RQ4: *'Does engagement with the mindful reflection tool have an enhancing effect on designers' interpersonal relationships?'*, a complementary method of analysis is applied with a supplementary data set. At the end of the study period, an open-ended

one-question qualitative survey was administered to explore the participants' perception of the effects of the tool upon their interpersonal relationships.

Output stemming from that reflection was analysed following a qualitative process consisting of:

- conjecture and refutation for initial categorisation;
- line-by-line coding for development of themes; and
- framing of the data around literature-supported mindfulness effects relevant to design concerns.

The conjecture-refutation process, according to Popper (2002), takes a clear scientific proposition and systematically strives to refute it. For this, a conjecture was developed based on the research question and was tested through a scrutiny of participants' responses in the following way:

- through initial categorisation;
- through line-by-line theme coding; and
- through framing around literature-supported mindfulness benefits.

3.6 Methodology for Research Question RQ3

Research question RQ3 is: *What kinds of personal and professional values arise upon mindful reflection in context with collaborative design?*

An important aspect of this research programme is the development and implementation of a design-relevant mindfulness-based intervention, or *mindful design device* (see Section 2.7). One of the intervention's important properties is that it generates unique data that stems from the tool's object of mindful inquiry. This data provides the opportunity to analyse and develop theoretical categories about what motivates designers in particular contexts, in this case, designers in a collaborative design context.

As explained earlier, data collection follows a pre-structured emphasis by implementing an *a priori* model (also known as predetermined, *precoded* or pre-set) where initial codes drawn from the research questions are used as a guide to establish the context and potentially reduce classification inconsistencies (Crabtree & Miller, 2000; Saldaña, 2015; Lavrakas, 2008). Usually this approach is part of research projects that assume that it is important to concentrate on certain aspects of the phenomena under investigation (King, 1998; 2012). With the data analysis following an open emphasis or emergent model (Boyatzis, 2009), this hybrid approach helps to keep the qualitative analysis relevant and focused (Stuckey, 2015).

When GT is used, some of the common sources of data are observation, interviews or document analysis (Charmaz, 2006; Strauss & Corbin, 1990). Yet, literature suggests that this method can use any data (Glaser

& Holton, 2007; Allan, 2003). Strauss & Corbin (1990) offer some general considerations for sampling in grounded theory:

- The group to study should be chosen based on the main research question.
- The types of data that will be used should be chosen based on whichever ones best capture the information sought.

In seeking to develop theoretical categories about what kinds of personal and professional values arise upon engagement with a *mindful design device* in context with collaborative design, the tool acts as a form of qualitative survey. This type of survey seeks to explore meanings and experiences (Fink, 2003), and establish meaningful relevant dimensions and values within a population (Jansen, 2010). Qualitative surveys can be emergent (open) or predetermined (pre-structured). In this case, supporting this study's data collection model, some dimensions of the inquiry (personal and professional values) are defined beforehand with a structured protocol for questioning (ibid).

The process of collecting data in this predetermined way, is understood in this study as *First Stage Coding*. This first stage captures the precoded data to focus specifically on participants' Selves (or roles) to establish personal and professional contexts; and also, on participants' perception of what seems important at the time of reflection to establish the context of values. To potentially reduce categorisation inconsistencies, participants were asked to utilise a one-word value to represent their perceived meaningful concern or motivational goal. The collected data consists of multiple submissions stemming from engagement with the *mindful design device* inquiring into participants' personal and professional values. With

designer personal and professional values as the base category framework, the output for each engagement is comprised of two parts:

- Role (or Self): the identity associated with a value (i.e. designer, runner, friend);
- Value: the meaningful motivational goal or principle as associated with the role (i.e. balance, dedication, openness).

The role contextualizes the expressed meaningful concern; for example: COMMITMENT has a different frame of reference from the perspective of the role of a CYCLIST than from that of the role of a HUSBAND.

In GT, codes that relate to common themes are grouped together to form concepts; then similar concepts are organized to form categories (Strauss & Corbin, 1990; Allan, 2003). Charmaz (2008) states that coding consists of at least those two phases and refers to them as initial coding and focused coding.

Thus, this study's *Second Stage Coding* is about *initial concepts*, and *Third Stage Coding* is about *focused categories*. Second and Third Stage Coding occur in the data analysis phase.

To summarise, this study's coding stages for research question RQ3 are:

- *First Stage Coding:* capture of *precoded* data;
- *Second Stage Coding:* initial coding to form concepts;
- *Third stage coding:* focused coding to form categories.

3.6.1 Data Collection for Research Question RQ3

To arrive at the *a priori* or precoded output, participants were invited to engage in a daily mindful inquiry with the following instructions:

> *For all your engagements, always start and return to your observing self. A self is understood as a role or identity. Your observing self represents the entity from where you are able to observe all your other roles. For this exercise, you will reflect from the perspective of two of your roles (or selves). One of your roles will be DESIGNER in the context of a collaborative setting; and the second one can be any other of your roles that may arise (designer in any context, concerned citizen, cyclist, sibling, cousin, health enthusiast, business owner, engineer, musician, parent, teacher, etc.).*
>
> *STEP 1: Ask yourself the following question:*
>
> *WHAT SEEMS MOST IMPORTANT NOW FROM THE PERSPECTIVE OF MY ROLE AS DESIGNER IN A COLLABORATIVE SETTING?*
>
> *Pause. Be alert to what arises. ¿To what value does this concern belong? It may help to consider it as "an appreciation for... " or " a belief in...".*
>
> *For example: If my thought was: "I'm concerned that the workload is unbalanced amongst team members"; then I may choose "FAIRNESS" as the value. The role (or self) is "DESIGNER".*

So, for STEP-ONE the submission would be: SELF: Designer | VALUE: Fairness*

STEP 2: Ask yourself the following question:

WHAT ELSE SEEMS IMPORTANT NOW FROM THE PERSPECTIVE OF ANY OF MY OTHER ROLES?

Pause. Be alert to what arises. ¿To what role and to what value does this concern belong to?

For example: If my thought was: "I need to keep up with my cycling training schedule". Then I may choose "DISCIPLINE" as the value, and "CYCLIST" as the role (or self).

So, for STEP-TWO the submission would be: SELF: Cyclist | VALUE: Discipline*

**The term SELF is used because in the initial induction, participants were exposed to an overview of the concept of the observing self as one construct of self-perception, which helps distinguish between awareness and the contents of awareness (Deikman, 1982).*

Output stemming from engagement with the *mindful design device* totalled 637 sets of role/value submissions (i.e. Role: RUNNER: Value:

COMMITMENT) from 14 participant students for the main[1] group over the study period. These data units constituted the *First Stage* or predetermined coding phase of the study establishing the context of the personal and professional values that emerged as meaningful to designers in the group of participants.

3.6.2 Data Analysis for Research Question RQ3

Charmaz (2006) says that, in GT, data must be scrutinized repeatedly throughout the process of analysis by asking both *action* and *analytic* questions as suggested by Glaser (1978). These questions are:

- Action: *What is happening here?*
- Analytic: *What category are these data a study of?*

Charmaz asserts that the first question propels a detailed examination of the empirical world often using gerunds like 'waiting', 'being', etc.; while the second question links this world to theoretical possibilities. Both questions, in her view, motivate a systematic following of emergent leads (ibid). The focused nature of this study led to a relevant adaptation of these systematic questions in order to analyse the data in context with the research question.

During the process of coding, the data is interrogated by line, by sentence, by paragraph, or as a whole document. Given that the participant submissions in this study are multiple focused two-word statements as opposed to narrative paragraphs, the closest application of data interrogation to adapt is the line-by-line. According to Holton (2007) this is

[1] An opportunity emerged to apply the data collection and analysis to a second collaborative design group. See Section 3.8.

a tedious but important method the result of which is rich and dense theory that leaves nothing out.

She outlines its benefits in the following way:

- it forces the researcher to verify and saturate categories;
- it minimises the chances of missing important categories;
- it ensures relevance:
    - of the generated codes because codes are generated that fit the area under study; and
    - of the emergent theory by enabling researchers to see what direction to take in theoretical sampling before becoming too selective or focused on a particular problem (ibid).

Values are understood in this inquiry as two aspects: *attributes* or *aspirations*; and the context of personal or professional values is established by asking participants to identify the Selves (or roles) to which they associate a value. Thus, to directly fragment the data into the elements that constitute a value, and to begin examining the emergent concepts that led to final categories in context with designers' personal and professional values, the *action* questions used to scrutinize the data under, '*What is happening here?'* are:

1. *Is this a personal or professional value?*
2. *Is this an attribute (understood as a quality, characteristic or trait); or an aspiration (understood as a desire, expectation or goal).*
3. *If it is an attribute, what does it promote? If it is an aspiration, what does it desire?*

The *analytic* questions used to scrutinize the data under '*What category are these data a study of?',* are

1. *From the perspective of what kind of personal/professional role is this? And/or…*
2. *From the perspective of this role, what kind of value is this?*

Table 3 shows an example of the analysis coding stages which answer Glaser's guiding questions. In the example, the submission consists of;

- a Self (or role): FRIEND; and
- a Value: COMMUNICATION.

Second Stage Coding answers the question *'What is happening here?'* by attempting to describe as a concept what the designer's meaningful concern or motivation is about. In this case it is a:

- personal attribute (the defining value aspect), that is
- promoting (action gerund) a
- forthcoming relationship (concept).

Third Stage Coding answers *'What category are these data a study of?'*, by attempting to establish a final category that groups similar concepts. Data is interrogated through the following analytic questions:

1. *From the perspective of what kind of personal/professional role is this?*
2. *And/or, from the perspective of this role, what kind of value is this?*

Table 3. Coding Stages Sample

First Stage Coding: Precoded Data	**Second Stage Coding:** Initial Concept	**Third Stage Coding:** Self Category	**Third Stage Coding:** Focused Category

Self: Friend; Value: Communication	A personal attribute promoting a forthcoming relationship.	Personal Relational	Relationality: Personal or professional quality promoting harmonious or cooperative interactions in human relationships.

Roles (or Selves) were categorised into the following categories:

- Designer: Role as collaborative design academic.
- Non-design Professional: Role as a professional in a field other than design. (i.e. Filmmaker, Entrepreneur, Language Tutor).
- Personal Relational: Role within close personal relationships. (Sister, Girlfriend, Husband, Granddaughter).
- Personal Skill/Hobby: Role within leisure activities. (i.e. Runner, Knitter, Gamer).
- Personal Individual/Reflective: Abstract introspective roles. (i.e. Person, Me, Mental-self, Individual).
- Student: Role within graduate design student general academic experience.

Arising from this inquiry, values were categorised into four major categories amongst the two defining value aspects. The main terms for each of the categories were chosen to represent the general category description. Thus, the intent of these terms is representational as science suggests that different areas of the brain represent related semantic concepts (Huth et. al, 2016). The significance to design, of engaging with this mindful inquiry tool becomes more evident considering that high-

creative thinking ability is related to the connectivity of different areas of the brain (Beaty et. al, 2018).

Strauss & Corbin (1990) offer some views on categorising that support this process:

- all coding and categorising is done on a provisional basis;
- revisions can be done whenever the analyst feels it is necessary to do so;
- deciding on the name for a category requires some imagination and sensitivity to the process or phenomenon being categorised;
- the chosen name must be something memorable, something that promotes thoughtful analysis, and something from which the researcher may draw theoretical inspiration;
- names may be derived from a commonsense interpretation of the data, arise from previous experience or from a review of relevant literature.

For example: the term “PROFICIENCY” was considered as well as “EFFICACY”; and the term “INTERPERSONAL RELATIONSHIPS” was considered as well as “RELATIONALITY”. Also, the process of categorising took multiple reconsiderations since some role/value sets could arguably be considered to fall in more than one category. For example: UNDERSTANDING as a value from the perspective of the role of FRIEND, can be considered both a personal attribute to produce an intended result; or a personal attribute to promote harmony in a relationship. In this case, RELATIONALITY would be chosen as it appears to be more relevant to that category. Each of the role/value sets fell into one of the following categories and ultimately constituted a collaborative designers’ evolving personal and professional values framework:

- *Attributes*:
    - Efficacy: Personal or professional quality promoting the ability to produce a desired or intended result.
    - Relationality: Personal or professional quality promoting harmonious or cooperative interactions in human relationships.
- *Aspirations:*
    - Development: Desire for personal or professional continued learning or knowledge acquisition.
    - Achievement: Desire for personal or professional success.

3.6.3 Data Dependability for Research Question RQ3

Part of the contribution of this study, in relation to the inquiry explored by research question RQ3, is a method to generate unique data and develop theoretical categorisations about designers' evolving values. To ensure the dependability (Erlandson et al., 1993), and to improve the trustworthiness of the qualitative research (Carcary, 2009) pertaining to research question RQ3, a research audit trail for peer examination in order to improve the trustworthiness of the theoretical categorisation process pertaining to research question RQ3, was conducted (See Appendix B).

The general purpose of this process is that another researcher can follow the decision trail and arrive at least similar, but not contradictory conclusions (Sandelowski, 1986). In context with the Thematic Analysis approach, this researcher has focused on establishing a clear description about how data analysis was conducted, and which assumptions informed the analysis, in order to facilitate evaluation of the data's trustworthiness (Nowell, Norris, White & Moules, 2017). This process is different from

inter-coder reliability, which seeks to examine the degree of agreement of multiple coders across the same data (Kurasaki, 2000). In this case, the focus is on dependability in that, from the perspective of constructivist paradigms, the authenticity that allows the data to speak is valued over reliability (Nili, et. l, 2017). Moreover, confirmability can be established once the audit has demonstrated successfully the rationale of the process in which analytical decisions were made (Guba & Lincoln, 1989).

As part of this peer review, a random sample of data units was selected, and three peers were invited to experience and weigh-in on the process of assigning role/vale sets to the emerging categories. An explanatory document and an online form[2] were developed where the reviewers were able to assign categories to the selection of data units. An essential part of this process was to reconsider the category choices iteratively and resubmit the form several times as this was the actual undertaking in which categories were refined in the study.

The resulting submissions revealed a general agreement with the categorisation process. In the experience of categorisation itself, the reviewers assigning categories also resulted in similar results with each other, and with this Researcher's conclusions.

Where different categories were chosen, this was largely due to different interpretations of a value aspect. A possibility for a future study to consider adding value aspect options (attribute or aspiration) to the predetermining of codes, so that participants can more clearly establish the context of their

[2] Retrieved from https://goo.gl/forms/PSjGI9yuTCp22lOV2

submission. Appendix B contains the full text and results of the peer examination process.

3.7 Methodology for Research Question RQ4

A supplementary data set was collected at the end of the study period through an open-ended final reflection to explore the participants' perception of the effects of the *mindful design device* upon their interpersonal relationships. A qualitative analysis process was applied consisting of:

- conjecture and refutation,
- thematic coding analysis, and
- framing of the data around mindfulness effects relevant to design concerns.

According to Popper (2002) the process of systematically attempting to refute a scientific proposition differs from the verification of it in that evidence can only indicate degrees of probability and does not prove a universal truth. Some of his conclusions, advancing the concept of Classical Rationalism, in opposition to verification are that:

- It is easy to obtain confirmations, or verifications, for nearly any theory – if we only look for confirmations.
- A theory which is not refutable by any conceivable event is non-scientific.
- Every test of a theory is an attempt to falsify it, or to refute it.
- Confirming evidence should not count except when it is the result of a genuine test of the theory; and this means that it can be presented as a serious but unsuccessful attempt to falsify the theory.

Spencer (2008) clarifies how Popper's Critical Rationalism refutes Classical Empiricism and Classical Rationalism:

- Classical Empiricism sees knowledge as manifest; data is collected using observation as a base, hypotheses and theories are constructed which fit the collected data, those theories are tested and verified by a process of confirmation.
- Classical Rationalism sees knowledge as manifest; using reason and logic as a base, theory is constructed, deducting from theory to explain phenomena, theories are tested and verified by how well phenomena are explained, or predicted by the theory.
- Critical Rationalism sees knowledge as constructed; theories and hypotheses are generated and conjectured, examination is placed centrally in rigorous attempts at refutation, theories are tested by attempts to falsify. Critical rationalism is asymmetrical in its method: a negative test result may serve as a refutation; a positive result cannot serve as a conclusive proof.

Based on research question RQ4: *'Does engagement with the mindful design device have an enhancing effect on designers' interpersonal relationships?',* a conjecture was elaborated to test against participants' final reflections upon the experience of engagement with the *mindful design device*:

> *Conjecture:* ***Upon engagement with a mindful design device, designers will recognize improvements in their interpersonal relationships.***

3.7.1 Data Collection for Research Question RQ4

Participants were administered a qualitative survey question in the form of a final reflection[3] to read:

> *In what way do you feel your interpersonal working relationships may have been influenced due to engagement with this practice?*

The word 'working' was added so as to encourage the context of the reflection to be within their role as designers. Between the two participant groups, a total of 19 responses were submitted.

3.7.2 Data Analysis for Research Question RQ4

The data pertinent to the conjecture was identified through three categories of statements:

- **Category 1**: Supporting the conjecture and supporting other mindfulness benefits.
- **Category 2**: Refuting the conjecture and supporting other mindfulness benefits.
- **Category 3**: Supporting other mindfulness benefits.

Besides reflecting on the effect in interpersonal relationships, and possibly because of the open-endedness of the question, participants chose to also share effects about their experience and perceived effects with the *mindful design device* that were not specific to interpersonal relationships. The basic suggestion of the conjecture is that designers will recognize and describe potential improvements that they perceive to be caused by their

[3] (n.d.). Retrieved from https://goo.gl/forms/xw0pK9bDd4t7ZD5D3

sustained mindfulness exercise. The reflective question is specific towards the correlation between mindful reflection and any perceived influence on interpersonal relationships. The inquiry purposely did not use the word 'improved' so as to allow any perceived effect specific to interpersonal relationships to arise. Instead, the word 'influenced' was used to encourage description of any transformation.

The process of analysis of the data revealed that, although many of the participants did, not everyone perceived or chose to share effects specific to their interpersonal relationships only, or at all. In fact, many of the participants chose to either include or only share other effects that were not specific to interpersonal relationships, although arguably, having a potential influence on relational contexts. Thus, the data showed other complementary components to mindful reflection effects in this context that were not described in the initial conjecture.

As discussed in Chapter 2, improvement in interpersonal relationships is an important suggested mindfulness benefit that is relevant to design concerns. Table 4 lists a few of these benefits extracted from Table 10 as examples. They were adapted from a literature supported list of benefits relevant to design (see Table 9). Each of the suggested effects was coded to use in the analysis of the data to correlate with participant statements supporting other effects stemming from engagement with the *mindful design device*.

Table 4. Coded Mindfulness Benefits Sample
M01: spontaneous, non-egocentric action
M02: social connectedness

M03: compassion;
(included as part of M01): eco-centricity
M05: self equals other

Examples of each of the categories of statements are as follows:

- Supporting the conjecture directly:
    - *'I could see that after being involved in this process i was more aware of my co-worker needs for the projects. I started having small habits such as asking if anyone needed coffee or tea when I was going to grab one for myself.'*
- Refuting the conjecture:
    - *'I haven't found that my own working relationships have changed. Some people seemed to have really taken the practice on board which may have led to a change that I simply didn't perceive, but in general I think that the practice may have been too introspective to have a noticeable (to me) impact in a group setting.'*
- Supporting other related mindfulness claims:
    - *'This practice made me more aware of the things I found important during work and where I may be more unproductive and weaker and needed to improve.'*

Samples of the data for research question RQ4 are included in this section organised by categories of analysis as follows:

- **Category 1**: Supporting the conjecture and supporting other mindfulness benefits:
    - Table 5 contains a sample statement as collected that clearly supports the original conjecture suggesting that improvement

in interpersonal relationships would be recognized upon engagement with the *mindful design device*. Although all these reflections contain support for the conjecture, some also contain a reference to other related effects not specific to interpersonal relationships, but potentially having an influence on relational contexts.

- **Category 2**: Refuting the conjecture and supporting other mindfulness benefits:
    - Table 6 contains a sample statement refuting the original conjecture; meaning that no influence was perceived specifically on interpersonal relationships. Some statements here support other related effects.

- **Category 3**: Supporting other mindfulness benefits:
    - Table 7 contains a sample statement describing the perceived effects of the practice that are not specific to interpersonal relationships but potentially having an influence on relational contexts. Many of the participants chose to reflect fairly extensively on these perceptions.

All statements were coded and analysed by line to develop themes and draw conclusions. Statements were assigned letter-number codes to represent the participant group, and theme notes are in italics and in parentheses containing the related code of the supported mindfulness benefits (Sample in Table 4).

Table 5. Category 1

Sample statement supporting the conjecture and other mindfulness benefits

MDI-1A

LINE-1A1
Maybe became more aware of how my personal outlook was integrated with/ completely often relied upon my relationships with others, focusing on the importance of these relationships more.

(Becoming more aware of the impact relationships have on personal outlook; supporting mindfulness benefits: M19; M24; M26; M31; M32; M34)

Table 6. Category 2

Sample statement refuting the conjecture and supporting other mindfulness effects

OPEN-2C

LINE-2C1
I didn't find a direct relationship between the exercise and interpersonal working relationships, but I did find it somewhat helped me put things in perspective.

(putting things in perspective; supporting mindfulness benefits: M23; M24)

Table 7. Category 3

Statements supporting other mindfulness effects

MDI-3A

LINE-3A1
More understanding of external factors affecting work and motivation.

(becoming more aware of external influences; supporting mindfulness benefits: M19; M24)

Analysis of participants' statements yielded additional mindfulness benefits beyond improved interpersonal relationships. Thus, the original conjecture was found to be incomplete and the submissions were analysed further to reflect a data-informed version.

The original conjecture reads:

> ***Upon engagement with a mindful design device, designers will recognize improvements in their interpersonal relationships.***

Stemming from the analysis of participants' submissions, the original conjecture was refuted directly by some participants, and found to be incomplete. A revised, data-informed conjecture statement was sought to include a more accurate description of the most prevalent mindfulness benefits. From the initial overview of the new data-driven information, a transitional statement was constructed to embody the new suggested mindfulness effects stemming from a framing of the statements around the mindfulness benefits, to read:

> ***Upon engagement with a mindful design device, designers can recognize mindfulness effects such as:***
>
> - improved interpersonal relationships;

- openness to multiple perspectives;
- more informed perceptions;
- greater sensitivity to their environment;
- receptivity to their experience of connection with their inner world;
- receptivity to their experience of connection with others;
- receptivity to their own intuition.

These additional mindfulness benefits in the new data-informed conjecture, were included with confidence because of their widespread prevalence across the majority of the submissions and their correlation or similarity with other effects on the list. The new mindfulness effects were analysed further to find similarities and explore the possibility of a more concise affirmation. A sample analysis of one of the mindfulness effects reads as follows:

> ***'Improved interpersonal relationships'*** *was evidenced by statements reporting increased awareness of not just relationships in general, but also: awareness of others' state of being; validation of others' uniqueness; inclination to resolve pending issues; awareness of others' working needs; and becoming more generous and considerate.*

A deeper analysis of these themes framed around the observed mindfulness effects yielded a more succinct categorisation. Effects were arranged into two final focused categories:

- Becoming more aware of *intrapersonal* and *interpersonal* aspects; and,
- Becoming more aware of the impact of self-awareness on *intrapersonal* and *interpersonal* aspects.

From the critical analysis of the new data-driven information, a final statement was constructed to embody the new categories of suggested mindfulness effects:

> ***Upon engagement with a mindful design device, designers can experience mindfulness benefits by becoming more aware of intrapersonal and interpersonal aspects; and, by becoming more aware of the impact of self-awareness on intrapersonal and interpersonal aspects.***

Increased awareness is evidenced for each dimension in focused ways. An analysis sample of one of these dimensions reads as follows:

> ***Interpersonal aspects*** *refer to becoming more aware of:*
>
> - *others' state of being*
> - *others' values*
> - *others' unique value to the team*
> - *others' working needs and challenges*
> - *others' influence and/or impact on oneself*

These focused effects suggest a transformation, upon engagement with the *mindful design device*, in the way interpersonal and intrapersonal relationships are conducted, in collaborative design contexts. Section 5.7 discusses potential implications such effects on design collaboration.

Chapter 5 displays exemplars of the collected data and presents the complete set of conjectures and analyses. Appendix E contains the full extent of the data, as collected for RQ4.

3.8 Participants Information

The case studies consisted of participants engaging on a suggested daily (or almost daily) frequency with the *mindful design device* over a period of 30 calendar days. Suitable data was determined to be a frequency of engagement of at least once every 3 days continuously and throughout the study period, as this was considered by the researcher as a reasonable indication of sustained awareness of the practice.

One engagement, as per the tool's guidelines, constituted at least two (2) role/value sets, so the minimum number of data units per participant was 20. The basic requirement of the participant profile was that they were part of a collaborative design context where interpersonal relationships are a significant factor.

3.8.1 MDI Group

The main set of participants is composed of 14 design students who were in their first semester of a Multidisciplinary Innovation Masters programme[4] at Northumbria University, Newcastle, UK. Originally, 17 students agreed to participate but 14 of them completed the minimum engagements.

The group consists of students from diverse disciplines who learn design-led innovation working collaboratively on real projects with external organisations. Some examples of the types of projects that the students were working on are:

[4] Multidisciplinary Innovation MA at Northumbria University. (n.d.). Retrieved from https://www.northumbria.ac.uk/study-at-northumbria/courses/multidisciplinary-innovation-dtfmdy6/

- National Trust. New user experiences of Seaton Delaval Hall[5].
- Addressing Incontinence in Refugee Camps.
- Circular Economy Thinking. The future of treats (chocolate).
- The Skill Mill. Developing a social enterprise: employment opportunity for youth ex-offenders.

All the projects have the following in common:

- They are underpinned with attempts to understand the materials and dynamics of situations through the lens of multiple human perceptions;
- They are concerned with developing proposal for new situations, constructed from new and adapted systems, services, and/or products and communications; and
- They aim to deliver new forms of human centred worth (value).

Throughout the semester the students had a weekly seminar session that aimed at professional understanding and development, team dynamics and team leadership. Each student had to complete a reflective assignment that required a consideration of innovation practice theory, how individually they had applied and experimented with that in practise and their understanding of that area and how they were going to further that understanding in the second half of their course[6].

This group was referred to as MDI and a total of 637 sets of roles/values constituted the analysed data.

[5] (n.d.). Retrieved from https://www.nationaltrust.org.uk/seaton-delaval-hall

[6] Information on the course was corroborated by course leader Dr. Nick Spencer: https://www.northumbria.ac.uk/about-us/our-staff/s/nicholas-spencer

3.8.2 Open Group

During the programme period, an opportunity arose to apply the data collection and analysis methods to a similar collaborative design participants group. An invitation to participate was posted on the JISC PhD Design List[7] with the only requirement being that participants were designers involved in a collaborative design approach. This group was referred to as OPEN and it differs from the MDI group in that:

- The OPEN group consists of participants who did not know each other and in fact lived in countries apart.
- The OPEN group consists of participants who are PhD level researchers and/or students, as opposed to Master level.

This group consisted originally of 17 participants, and five (5) completed the minimum required engagements. This yielded 225 data units over the study period. All participants in the OPEN group, perhaps due to the community where the invitation was posted, were design multidisciplinary PhD students and/or academic researchers. Thus, the same categories framework was applied seamlessly, and the same categories emerged as meaningful more often (EFFICACY and RELATIONALITY). Likewise, due to contextual similarities, the final reflection data pertaining to the OPEN group was considered together with that of the MDI group. Thus, the analysis of the supplementary data considered 14 entries from the MDI group and 5 for the OPEN group.

Chapter 4 contains exemplars of the data sets and analysis for Research Question RQ3. Appendix D contains the full extent of the data. Chapter 5

[7] Invitation to Participate (n.d.) Retrieved from: https://www.jiscmail.ac.uk/cgi-bin/wa-jisc.exe?A2=ind1701&L=PHD-DESIGN&O=D&P=52963

contains exemplars of the data sets and analysis for Research Question RQ4. Appendix E contains the full extent of the data.

3.8.3 Ethics

Ethics approval was received in November 2015. Consent[8] and data collection[9] were managed through a Google® Docs forms system and stored in a restricted-access cloud account. Appendix F contains information of all the relevant forms used in the induction of participants, and in the gathering of mindful reflections for analysis.

[8] Informed Consent Form (n.d). Retrieved from https://goo.gl/forms/3P36IHPxZi5qF04g1

[9] Mindful Reflection Form (n.d.). Retrieved from https://goo.gl/forms/tCrC85FY7wAZB5Dj2

Chapter 4
DATA ANALYSIS FOR RQ3

Contents

4.1 Introduction

Due to the vast extent of the data associated with it, this chapter contains a sample of each of the categories of the data pertaining to Research Question RQ3: *What kinds of personal and professional values arise upon mindful reflection in context with collaborative design?* as it was collected. Chapter 3 describes in detail the methodology for data collection and analysis that lead to the final theoretical categories, and the full extent of the data can be found in Appendix D.

In order to present it in an organised manner, it was arranged around the major values categories emerging from the analysis.

The four major value categories[1] are:

- Efficacy: Personal or professional quality (or attribute) promoting the ability to produce a desired or intended result.
- Relationality: Personal or professional quality (or attribute) promoting harmonious or cooperative interactions in human relationships.
- Development: Desire (or aspiration) for personal or professional continued learning or knowledge acquisition.
- Achievement: Desire (or aspiration) for personal or professional success.

[1]To aid in clarity, the categories have been highlighted in individual colors and a legend was included in all of this chapter's pages

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Although the role categories are not represented in full in this chapter, the six major role categories that emerged from data analysis are:

- Designer: Role as collaborative design academic.
- Non-Design Professional: Role as a professional in a field other than design. (i.e. Filmmaker, Entrepreneur, Language Tutor).
- Personal Relational: Role within close personal relationships. (i.e. Sister, Girlfriend, Husband, Granddaughter).
- Personal Skill/Hobby: Role within leisure activities. (i.e. Runner, Knitter, Gamer).
- Personal Individual/Reflective: Abstract introspective roles. (i.e. Person, Me, Mental-self, Individual).
- Student: Role within graduate design student general academic experience.

Data samples appear as they were submitted by participants and it consisted of multiple submissions resulting from engagement with the mindfulness-device.

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

4.2 Data Sample – Efficacy

Personal Efficacy: Understood as a personal quality (or attribute) promoting the ability to produce a desired or intended result.

Personal Efficacy

ROLE CATEGORY: **PERSONAL INDIVIDUAL/REFLECTIVE**

MDI GROUP - SELF	MDI GROUP - VALUE
Adult Self	Productivity
Adult Self	Productivity
Dreamer	Imagination
Adult Self	Energy
Human Self	Equanimity (Shock)
Individual	Positivism
Individual	Excitement
Individual	Gratefulness
Human Self	Aliveness
Adult Self	Balance
Adult Self	Determination
Diabetic	Self-care
Diabetic	Self-care
Individual	Rest
Diabetic	Self-care
Individual	Patience
Diabetic	Discipline
Healthy Self	Discipline

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Lazy-Self	Self-worth (Pathetic)
Healthy Self	Energy
Self-organizer	Inner Harmony
Person	Inner Harmony
Individual	Motivation
Planning-self	Timeliness
Resting-self	Discipline
Healthy Self	Balance
Person	Pride
Person	Adaptability
Person	Discipline
Healthy Self	Calm
Healthy Self	Perseverance
Person	Balance
Person	Openness
Person	Letting go
Person	Confidence
Healthy Self	Calm
Healthy Self	Confidence
Healthy Self	Robustness
Person	Time-management
Healthy Self	Pace
Healthy Self	Pace
Healthy Self	Optimism
Financial-self	Discipline
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Citizen	Responsibility
Myself	Effort
Consumer	Awareness

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

Observer	Discipline
Citizen of Earth	Perception
Human	Wisdom

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

4.3 Data Sample – Relationality

Personal Relationality: Understood as a personal quality (or attribute) promoting harmonious or cooperative interactions in human relationships.

Personal Relationality	
ROLE CATEGORY: **PERSONAL SKILL/HOBBY**	
MDI GROUP - SELF	**MDI GROUP - VALUE**
Walker Traveler Football-self	Connectedness Openness Teamwork
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Volunteer Traveller Dancer	Respect Sensitivity Openness

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

4.4 Data Sample – Achievement

Personal Achievement: Understood as a desire (or aspiration) for personal success.

Personal Achievement

ROLE CATEGORY: **PERSONAL INDIVIDUAL/REFLECTIVE**

MDI GROUP - SELF	MDI GROUP - VALUE
Adult Self	Health
Individual	Health
Adult Self	Health
Individual	Health
Adult Self	Money
Individual	Wellbeing
Mental Self	Happiness
Me	Pleasure
Resting-self	Peace
Relaxing-self	Peace
Resting-self	Peace
Resting-self	Peace
Healthy Self	Self-care
Person	Looking forward
Clean-self	Purity
Sleeping-self	Dreaming
Ideation-self	Dreaming
Healthy Self	Fitness

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Healthy Self	Fitness
Healthy Self	Fitness
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Myself	Freedom
Meditator	Clarity
Myself	Relaxation
Myself	Love
Myself	Homecoming
Woman	Sacred feminism
Client	Pleasure
Human Being	Truth
Human	Connectedness
Human Being	Meaningfulness
Citizen	Participation

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

4.5 Data Sample – Development

Personal Development: Understood as a desire (or aspiration) for personal continued learning or knowledge acquisition.

Personal Development	
ROLE CATEGORY: **PERSONAL SKILL/HOBBY**	
MDI GROUP - SELF	**MDI GROUP - VALUE**
Runner Fitness Fitness Fitness Fitness Traveler Explorer Traveler Holiday-planner Runner	Growth Challenge Change Improvement Development Exploration Knowledge Planning Scoping Preparation
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
(none)	

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

4.6 Data Analysis

Section 3.6 describes in detail the method of analysis. As explained in Section 2.7, participants were encouraged to reflect upon what seemed important and assign both: a *value* to their role as a *designer*, as well as a *role* (or *self*) which they felt the arising concern belonged to when reflecting mindfully upon any other role of importance. In this document the terms *role* and *self* are used interchangeably although participants were exposed to the practice from the perspective of multiple self-conceptions or identities.

Thus, in the data display samples or this chapter, (and for its full extent on Appendix D), the term *self* is used to identify participants' submitted roles such as *designer, daughter, runner*, etc. The participants were offered as a guide, examples of values, such as: *timeliness, fairness or authenticity*, along with samples of what a full submission could look like. Moreover, they were invited to consider it as *"an appreciation for…" or a "belief in…"*. This is part of this study's aim to *precoding* the data in order to establish context.

In a few cases, submissions for *'Value'* came more in the form of a concerned unease or disquiet than that of an appreciation or belief. Some examples are: *"un-timeliness" or "pathetic".* Since this study understands values as attributes or aspirations (Almond & Wilson 1988; Rokeach 1973), negative concerns were reinterpreted for analysis and replaced by

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

what this researcher understood as a suitable appreciated or aspired value complementary to the participant's response.

These can be identified in the *'Value'* column like these format examples: *(un) timeliness or self-worth (pathetic)*. Other than the reorganization of submissions by the emerging categories, and the reinterpretation of the uneasy concerns, all data in this chapter, and in Appendix D, are entirely as originally gathered. Within each table, the submissions that belong to the MDI Group or to the OPEN Group, are identified accordingly (See Section 3.8 for detailed participants' information).

Table 8 is an example of the coding results[2] of the analysis to arrive at the final category descriptions following the method explained in Section 3.6. Data was collected in a *precoded* or predetermined way. This is understood in this study as *First Stage Coding*. This first stage captures the *precoded* data to focus specifically on participants' *selves* (or roles) in order to establish personal and professional contexts; and also, on participants' perception of what seems important at the time of reflection to establish the context of values.

Concepts on the *Second Stage* of the coding process were grouped by establishing commonalities which led to the creation of the final focused *Third Stage* categories.

[2] Appendix D contains the full extent of the data, as they were collected organised by the categories that were developed from the analysis.

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Table 8. Example of Coding Stages for RQ3

First Stage Coding: Role/Value unit	**Second Stage Coding:** Initial Concept	**Third Stage Coding:** Self Category	**Third Stage Coding:** Value Category
Runner: Commitment	A personal attribute promoting discipline in a sport.	Personal Skill / Hobby	Efficacy: Personal or professional quality promoting the ability to produce a desired or intended result.
MDI Team Member: Money	A professional aspiration yearning for financial prosperity.	Designer	Achievement: Desire for personal or professional success.

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Friend: Communication	A personal attribute promoting a forthcoming relationship.	Personal / Relational	Relationality: Personal or professional quality promoting harmonious or cooperative interactions in human relationships.
Myself: Learning	A personal aspiration yearning for personal improvement through schooling or life experiences.	Personal Individual / Reflective	Development: Desire for personal or professional continued learning or knowledge acquisition.

A number of further research opportunities arise from expanding aspects of this study with larger participant samples in order to implement complementary quantitative methods for data analysis. Whilst this thesis presents rich qualitative data suitable for case-study, the sample size would need to be larger in order to be statistically significant. Some of these quantitative opportunities are described in Appendix C.

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

4.7 Discussion

Research Question RQ3 reads: *'What kinds of personal and professional values arise upon mindful reflection in context with collaborative design?'*

This question is inspired by and hopes to contribute to the discussion of design guiding principles (Lawson, 2006). The role of the *mindful design device* here is to contextualize the device's relevancy to collaborative design and to do so through a mindful process in order to insert an application of mindfulness into design education. Design guiding principles are defined by Lawson (ibid) as personal and professional values and beliefs that impact design decisions. To select designers' personal and professional values as a suitable mindful object of attention in the practise as described in this programme, makes the *mindful design device* relevant to design concerns.

The capacity of the *mindful design device* to generate unique data about the values of the group of participants engaging with it, contributes to our understanding of what values influence design decisions in discrete contexts. In this case, the context is collaborative design and the objective is to explore the potential of the *mindful design device* to reveal designers' values, and to enhance interpersonal relationships in design social interactions. Literature supports that mindfulness practices can potentially permeate relational concerns. To make the *mindful design device* relevant to relational concerns, an additional mindful object of attention of the

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

practise is personal and professional roles. This links directly to design guiding principles personal and professional values and to relational contexts, as all interpersonal relationships have a role associated with it (McConnell, 2011). Hence, as illustrated in this thesis, the *mindful design device* is concerned with the relational *eight sense* as described in 'The Wheel of Awareness', of which this study's mindfulness intervention is an adaptation (Siegel 2012; 2016). Moreover, through a mindfulness-based process, it generates unique data about designers' roles and values that through the described methodology, support the development of a framework of designers' values in multidisciplinary collaborative design.

Appendix D contains the full extent of the data for RQ3 as they were collected and organised by the theoretical categories that were developed from the analysis. Chapter 5 contains samples of the data sets and the full analysis details for Research Question RQ4.

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Chapter 5
DATA ANALYSIS FOR RQ4

Contents

5.1 Introduction

This chapter contains exemplars of the data collected, and describes the full analysis pertaining to Research Question RQ4:

> *'Does engagement with the mindful design device have an enhancing effect on designers' interpersonal relationships?'*

A conjecture was elaborated to test against participants' final reflections upon the experience of engagement with the *mindful design device*:

> *Conjecture:* ***Upon engagement with a mindful design device, designers will recognize improvements in their interpersonal relationships.***

Participants were administered a qualitative survey question in the form of a final reflection to read:

> *In what way do you feel your interpersonal working relationships may have been influenced due to engagement with this practice?*

The word 'working' was added so as to encourage the context of the reflection to be within their role as designers. Between the two participant groups, a total of 19 responses were submitted. A detailed description of the methodology can be found in Section 3.7. The data pertinent to the conjecture was identified through four categories of statements:

- **Category 1**: Supporting the conjecture and supporting other mindfulness benefits.
- **Category 2**: Refuting the conjecture and supporting other mindfulness benefits.
- **Category 3**: Supporting other mindfulness benefits.

Besides reflecting on the effect in interpersonal relationships, and possibly because of the open-endedness of the question, participants chose to also share impact to their experience and perceived effects with the *mindful design device* that were not specific to interpersonal relationships.

The analysis of the data showed that, although many of the participants did, not everyone perceived or chose to share improvements specific to their interpersonal relationships only, or at all. In fact, many of the participants chose to either include or only share other effects not specific to interpersonal relationships although potentially having an influence on relational contexts.

A fourth category reflecting entries which did not support the conjecture, nor supported any mindfulness benefits was considered. A detailed overview of the available data reflected that all entries had some type of reflective experience that can be reasonably understood to have had a mindfulness effect. This is likely due to the context of the question which in itself requires and is embedded with a degree of self-reflection which constitutes a dimension of mindfulness. Once a participant takes the time to make an internal assessment, whether in the outcome of the reflection the conjecture is refuted or supported, the process is by definition a mindful one. Thus, whilst there was data specifically supporting the conjecture as well as rejecting the conjecture, all submissions showed other complementary components to mindful reflection effects.

The next sections display data set exemplars organized by each of the categories of statements. All statements were coded and analysed line by line to develop themes and draw conclusions. Statements were assigned

letter-number codes to represent the participant group[1] (MDI; OPEN); theme notes are in italics and in parentheses containing the related code of the supported mindfulness benefits.

In order to arrive at a list of mindfulness benefits relevant to the context of this study, they were extracted from this programme's reviewed literature. They are either specific to design literature or were chosen because of its direct relevance to design. For example, a benefit of 'social connectedness' (Hutcherson et al., 2008) from mindfulness literature is relevant to collaborative design as it is reasonable to consider it a potential enhancement to social interaction. Table 9 provides a list of mindfulness benefits extracted from literature; and Table 10 provides a list of mindfulness benefits coded for analysis.

Table 9. Literature-based Mindfulness Benefits

Mindfulness Benefit	**Literature Sources**
spontaneous, non-egocentric action	(Rosch, 1997)
social connectedness	(Hutcherson et al., 2008)
compassion, eco-centricity, 'self equals other'	(Austin, 1999)
reduction to habitual responding	(Wenk-Sormaz, 2005)
equanimity, acceptance, calm, clarity	(Spencer, 2008)
less cognitive and emotional disturbance	(Kabat-Zinn, 1990) (Lynch et al., 2006) (Shapiro et al., 2006) (Brown & Ryan, 2003)

[1] See Section 3.8 for participants' information.

loving kindness, compassion, joy, and equanimity	(Kraus & Sears, 2009)
empathy	(Shapiro et al., 1998) (Krasner et al., 2009)
high-levels of performance and excellence	(Wallace, 1999) (Goleman, 2013)
heightened state of involvement, wakefulness, being in the present, greater sensitivity to one's environment; more openness to new information; the creation of new categories for structuring perception; enhanced awareness of multiple perspectives in problem solving; openness to multiple perspectives; more informed perceptions	(Langer, 2000) (Langer, 2014)
superior coordinated performance in groups; improvement in social relationships	(Langer et al., 2009)
more creative organizations; more effective organizational learning; better decisions for all stakeholders in an organization	(Pirson et al., 2012)
openness	(Hart et al., 2013)
receptivity within the experience of connection with others;	(Siegel 2010; 2012)

connection with our inner world; connection with the unfolding of possibilities	
mindful relational contexts; enhanced interpersonal benefits	(Siegel, 2012) (Parker et al., 2015)
inner focus attunes us to our intuitions, guiding values, and better decisions	(Goleman, 2013)

Table 10. Coded Mindfulness Benefits
M01: spontaneous, non-egocentric action
M02: social connectedness
M03: compassion;
(included as part of M01): eco-centricity
M05: self equals other
M06: reduction to habitual responding
M07: equanimity
M08: acceptance
M09: calm
M10: clarity
M11: less cognitive and emotional disturbance
M12: loving kindness
(repeated): compassion
M13: joy
(repeated) equanimity

M15: high-levels of performance and excellence
M16: heightened state of involvement
M17: wakefulness
M18: being in the present
M19: greater sensitivity to one's environment
M20: more openness to new information
M21: the creation of new categories for structuring perception
M22: enhanced awareness of multiple perspectives in problem solving
M23: openness to multiple perspectives
M24: more informed perceptions
M25: superior coordinated performance in groups
M26: improvement in social relationships
M27: more creative organizations
M28: more effective organizational learning
M29: better decisions for all stakeholders in an organization
M30: openness
M31: receptivity within the experience of connection with others
M32: connection with our inner world
M33: connection with the unfolding of possibilities (included as part of M31): mindful relational contexts
(included as part of M26): enhanced interpersonal benefits
M34: receptivity to intuitions
M35: receptivity to guiding values
M36: better decisions

5.2 Category 1 Sample

Table 11 contains statements that clearly support the original conjecture suggesting that improvement in interpersonal relationships would be recognized upon engagement with the *mindful design device*. Of course, this is a direct result of inner views that highlighted how they have perceived a modified behaviour and/or became more aware of relational aspects; and then recognising its benefit.

Submissions included references to working relationships as well as personal relationships. Some of the most prevalent participant realisations were increased awareness of others' uniqueness, values, working challenges and needs, and a tendency towards generosity. Benefits other than relational were introspective realisations about inner transformation such as awareness of inner emotions and recognition of flexibility to more points of view.

Table 11. RQ4 Category 1 Sample

Statements supporting the conjecture and other mindfulness benefits
MDI-1A LINE-1A1 Maybe became more aware of how my personal outlook was integrated with/ completely often relied upon my relationships with others, focusing on the importance of these relationships more. *(Becoming more aware of the impact relationships have on personal outlook; supporting mindfulness benefits: M19; M24; M26; M31; M32; M34)*

OPEN-1H

LINE-1H1
It has made me a more considered person reflecting before I act.

(becoming more considerate and reflecting before actions; supporting mindfulness benefits: M01: M19: M26; M31)

5.3 Category 2 Sample

Table 12 contains statements refuting the original conjecture; meaning that no influence was perceived specifically on interpersonal relationships. Other mindfulness effects are evidenced in that, whilst their statements are specific to having discovered no relational benefit, they do suggest increased awareness in other ways which are compatible with mindfulness benefits suggested in literature.

To reach the conclusion that a change was not identified in the realm of relationships, is the result of a mindful reflection. Furthermore, a number of the reflections alluded to the fact that the participant felt they hadn't engaged with enough commitment to the practise and in that, recognising a missed opportunity for more potential impact. Other mindfulness benefits respond to an increased awareness of what is and what could've been.

Table 12. RQ4 Category 2 Sample

Statements refuting the conjecture and supporting other mindfulness effects

MDI-2A

LINE-2A1
I haven't found that my own working relationships have changed.

(perceiving no direct effect into relationships; supporting mindfulness benefits: M24; M32)

OPEN-2C

LINE-2C1
I didn't find a direct relationship between the exercise and interpersonal working relationships, but I did find it somewhat helped me put things in perspective.

(putting things in perspective; supporting mindfulness benefits: M23; M24)

5.4 Category 3 Sample

Table 13 contains statements describing the perceived effects of the practice that are not specific to interpersonal relationships but potentially having an influence on relational contexts. Many of the participants chose to reflect fairly extensively on these perceptions. Submissions in Category 3 were specific to mindfulness benefits that, although it could be argued that some could enhance relational contexts indirectly, they were not specific to it. For example, although it does not report a transformation of a relational context, one statement describes how the participant recognized and reflected upon visualising core values shared with family and with the design team.

Among others, this is clearly an example of more informed perceptions which is one of the mindfulness benefits listed. Other prevalent ones alluded to a clarity about motivations and what affects such motivations, a sense of increased self-esteem, recognising the benefits of pausing and contextual breaks, and noticing previously unobserved aspects of the surroundings.

Table 13. RQ4 Category 3 Sample

Statements supporting other mindfulness effects

MDI-3A

LINE-3A1
More understanding of external factors affecting work and motivation.

(becoming more aware of external influences; supporting mindfulness benefits: M19; M24)

OPEN-3H

LINE-3H1
I believe that engagement helped me visualize what are my core values (which are usually also the values my family and friends carry with them) and the values of the group I have been working with during my master research.

(becoming aware of self and other core values; supporting mindfulness benefits: M24; M25; M31; M35)

5.5 Data Analysis

Analysis of participants' statements yielded additional mindfulness benefits beyond improved interpersonal relationships. Thus, the original conjecture was found to be incomplete and the submissions were analysed further to reflect a data-informed version.

The original conjecture reads:

> ***Upon engagement with a mindful design device, designers will recognize improvements in their interpersonal relationships.***

Stemming from the analysis of participants' submissions, the original conjecture was refuted directly by some participants. A revised, data-informed conjecture statement was sought to include a more accurate description of the most prevalent mindfulness benefits.

As discussed in Chapter 2, improvement in interpersonal relationships is an important suggested mindfulness benefit that is relevant to design concerns. Likewise, as represented in Table 9, literature suggests these and other mindfulness benefits. Table 10 contains a list of these benefits extracted from Table 9. Each of the suggested effects was coded to use in the analysis of the data to correlate with participant statements supporting other effects stemming from engagement with the *mindful design device*.

From the initial overview of the new data-driven information, a transitional statement was constructed to embody the new suggested mindfulness effects stemming from a framing of the statements around the benefits contained on Table 10. The transitional conjecture reads as follows:

Upon engagement with a mindful design device, designers can recognize mindfulness effects such as:

- *improved interpersonal relationships;*
- *openness to multiple perspectives;*
- *more informed perceptions;*
- *greater sensitivity to their environment;*
- *receptivity to their experience of connection with their inner world;*
- *receptivity to their experience of connection with others,*
- *receptivity to their own intuition.*

The additional mindfulness benefits in the new data-informed conjecture were included with confidence because of their widespread prevalence across the majority of the submissions and their correlation or similarity with other effects on the list. Also, it should be stated that, although with lesser frequency, some of the reflections showed direct disagreement with the tool's proposed benefits. Some of these statements suggest that:

- too much introspection veils relational impact;
- the process has no effect on relationships; and/or,
- reflecting upon specific roles is limiting.

Whilst the statements are, on the surface, refuting the proposed benefits, they can arguably be considered a result of increased self-awareness, connection with their inner world, or receptivity to their intuition. These were considered in the final construction of the revised conjecture by keeping a tone of confidence with the potential effects, yet by not making absolute statements.

These new mindfulness effects were analysed further to find similarities and explore the possibility of a more concise affirmation:

- ***'Improved interpersonal relationships'*** *was evidenced by statements reporting increased awareness of not just relationships in general, but also: awareness of others' state of being; validation of others' uniqueness; inclination to resolve pending issues; awareness of others' working needs; and becoming more generous and considerate.*

- ***'Openness to multiple perspectives'*** *was evidenced by statements reporting the consideration of multiple alternate factors as a result of self-reflection; the consideration of new perspectives; and the practice of self-reflection from different points of view.*

- ***'More informed perceptions'*** *applied to many of the statements and was evidenced by statements reporting more awareness of the influence of previously unobserved factors; more awareness of others' states of being; more awareness of one's inner environment; making connections between increased awareness and the enhancement of meaningful factors; more awareness of others' values; more awareness of others' challenges; more awareness of others' working needs; more informed self-reflection; more awareness on how to improve their own self-reflective practice; more awareness of external influences; more clarity on meaningful choices; more present moment awareness.*

- ***'Greater sensitivity to their environment'*** *was evidenced by statements reporting more awareness of the impact of others; more aware of others state of being; more aware of others' working*

needs; more aware of others in personal and professional contexts; more awareness on the effects of awareness as in communication and stress reduction; becoming more considerate; more awareness of external influences; more awareness of the importance of self-care; enhanced tuning with the immediate environment.

- ***'Receptivity to their experience of connection with their inner world'*** *was evidenced by statements reporting awareness of impacts on personal outlook; awareness of inner emotions; awareness of the diverse effects of self-reflection on internal and external factors; increased depth of reflection time and pauses; increased self-knowledge; better self-reflection tools; sustained self-reflection; contextual discipline; balancing self-care with others' care; valuing self-reflection; awareness of areas of improvement; clarity of values.*

- ***'Receptivity to their experience of connection with others'*** *was evidenced by statements reporting awareness of impact of relationships on personal outlook; awareness of others state of being; awareness of the impact of self-awareness on relationships; validating the team value and uniqueness in others; consideration of others' working challenges; becoming aware of others' working needs; awareness of the impact of communication in reducing relationship stress; awareness of others' core values.*

- ***'Receptivity to their own intuition'*** *was evidenced by statements reporting connecting the impact relationships have on personal outlook; connecting self-awareness with improved interpersonal relationships; connecting consideration of multiple-perspectives as*

a result of self-reflection; connecting self-reflection with consideration of others' working challenges; concluding that more awareness can improve communication and reduce stress in relationships; concluding that too much introspection veils any relational impact; concluding no effect to relationships due to reduced engagements with the tool; connecting the balancing self-care with care for others as a result of self-reflection; concluding that having access to submissions would've yielded more impact; appreciating the value of self-reflection; considering that longer reflections would yield better results; recognising areas for self-improvement; concluding that roles are limiting; recognition of areas needing improvement upon self-reflection; correlating the practice with clarity of values.

A deeper analysis of these themes framed around the observed mindfulness effects yielded a more succinct categorisation. Effects were arranged into two final focused categories:

- Becoming more aware of intrapersonal and interpersonal aspects.
- Becoming more aware of the impact of self-awareness on intrapersonal and interpersonal aspects.

From the critical analysis of the new data-driven information, a final statement was constructed to embody the new categories of suggested mindfulness effects:

Upon engagement with a mindful design device, designers can experience mindfulness benefits by becoming more aware of intrapersonal and interpersonal aspects; and by becoming more aware of the impact of self-awareness on intrapersonal and interpersonal aspects.

Increased awareness is evidenced for each dimension in specific ways and foster more focused conclusions:

- Interpersonal aspects refer to becoming more aware of:
    - others' state of being
    - others' values
    - others' unique value to the team
    - others' working needs and challenges
    - others' influence and/or impact on oneself
- Intrapersonal aspects refer to becoming more aware of:
    - self inner environment / emotions
    - self personal outlook
    - external influences on self
    - the importance of self care
    - meaningful choices / values
    - opportunities for self improvement
    - ways to be more self reflective
- Increased self-awareness can impact the following interpersonal aspects:
    - becoming more generous
    - becoming more considerate
    - balance of self care with care for others
    - reduced stress in relationships
    - inclination to resolve relational issues
    - improved communication
- Increased self-awareness can impact the following intrapersonal aspects:
    - consideration of multiple perspectives
    - awareness of opportunities for self improvement

- clarity of values
- awareness of internal and external influencing factors
- inclination to have reflective moments
- more sustained self-reflection times
- inclination to add pauses

5.6 Discussion

Research Question RQ4 reads: *Does engagement with the mindful design device have an enhancing effect on designers' interpersonal relationships?*

According to the data produced by this study, the direct answer to this question is that engaging with a *mindful design device* can potentially have an enhancing effect on designers' interpersonal relationships. This is due to the data demonstrating that some of the participants definitely perceived a positive transformation to their interpersonal relationships, and some reported that they clearly did not. Some of the statements in the group that reported no enhancing effects on relational contexts, also reported that they felt they did not engage consistently with the practise. It is possible that this may have had some weight but to assess something like that, it is likely that a larger sample would be needed.

The reality of the data set is that some reported positive relational transformation, some reported no relational transformation, and some reported other mindfulness benefits not specific to relational contexts. There is also a possibility that the way the question was constructed led to confusion in the participants.

Although the question seems clear and that it wouldn't mislead a responder, but it is also a fact that about half of the participants chose to report effects other than relational. The question read:

> *In what way do you feel your interpersonal working relationships may have been influenced due to engagement with this practice?*

It could be argued that all those responses somehow considered that the effects they were reporting had a relational context in the background. In other words, they believed that those benefits somehow related to their interpersonal working relationships. By the same token, it could also be argued that they perceived no relational transformation but chose not to reject the conjecture directly but simply to report on the mindfulness effects they found relevant.

The data, as it stands, does not support a blanket generalisation that engagement with the *mindful design device* has an enhancing effect on designers' interpersonal relationships. There was enough cohesiveness in the data set to review the conjecture to reflect a more representative view of the responses and allow for a statement that captures a wider reach of possibilities. The final conjecture reads:

> ***Upon engagement with a mindful design device, designers can experience mindfulness benefits by becoming more aware of intrapersonal and interpersonal aspects; and by becoming more aware of the impact of self-awareness on intrapersonal and interpersonal aspects.***

Not knowing why many of the participants opted to not report or not refute directly the relational context of the question, it is a fact that the data reflected effects of awareness enhancement in both relational and individual dimensions. Qualities like increased awareness of self and other, and attributes like flexibility and generosity can be claimed with confidence. There is s level of compatibility with these results and literature-supported mindfulness benefits specific to interpersonal relationships. Science suggests that intrapersonal mindfulness practise yields interpersonal benefit:

> *Sensing the inner states of mind of another alters our own inner state. Therefore, looking toward our own inner world serves as the source of empathy for others' mental experience. Hence, reflection is both an inner and interpersonal gateway to insight, compassion, and empathy (Siegel, 2012 p490).*

Whilst the data does not solidly support a direct link between the device and interpersonal relationships, it does support that there is for some, there isn't for others, but that there definitely are mindfulness effects that can arguably lead to relational enhancements as literature suggests.

Appendix E displays the full extent of the data for RQ4. Chapter 6 considers how this study's findings contribute to new knowledge and its potential implications to design.

Chapter 6
CONCLUSION

Contents

6.1 Introduction

This chapter considers how this study's findings contribute to new knowledge and its potential implications to design. Following a general aim into making mindfulness more explicit in design contexts, the initial aspirations of this programme have been to:

- Propose a description of the concept of mindfulness as it relates to collaborative design concerns.
- Develop and implement a design-relevant mindfulness-based intervention (also referred-to in this study as a *mindful design device*).

In order to begin exploring such possibilities, two main research questions were developed to underpin this study's research design:

- RQ1: *How is mindfulness understood in design literature?*
- RQ2: *How can a mindfulness-based intervention be relevant to design?*

Relevant literature was reviewed and analysed to address these questions resulting in the identification, in depth analysis and description of intersections between mindfulness and design. Thus, a literature-supported design-relevant mindfulness-based intervention, known here as *mindful design device*, was developed and described. Two more research questions emerged stemming from this critical analysis after having established the following premises:

- That designers' personal and professional values are viable objects of mindful attention relevant to design.

- That improved interpersonal relationships are both a suggested mindfulness benefit as well as an area of opportunity for contribution in contemporary collaborative design contexts.

The two additional emerging research questions were:

- RQ3: *What kinds of personal and professional values arise upon mindful reflection in context with collaborative design?*
- RQ4: *Does engagement with the mindful design device have an enhancing effect on designers' interpersonal relationships?*

In this light, the following opportunities surfaced and helped to expand the scope of the contributions:

- To describe the potential of the *mindful design device* in generating rich unique data that helps to reveal designers' evolving personal and professional values.
- To propose a qualitative theoretical categorisation method of designers' evolving personal and professional values.
- To report on the perceived mindfulness effects that designers reveal, upon engagement with the *mindful design device,* about their interpersonal relationships.

It is clear from the review and analysis of this thesis that design is increasingly moving from a technical to a social understanding and that the interaction of design teams will continue to be the source of forthcoming research. In this light, 'social interactions, roles and relationships cannot be ignored in the analysis of design activity performed by teams' (Cross & Clayburn Cross, 1995, p28). Some authors try to establish a difference between emotional socio-psychological factors of conflict, and conflicts arising from team activities where disagreements

arise over behavioral preferences, needs or interests (Larsson, 2003). Furthermore, Mcdonnell (2012) raises the question of whether the skills associated with social interaction in any collaborative setting differ from those associated specifically to social interaction in a design collaborative setting. Whilst this researcher agrees with positioning collaborative design as a category of design pursuit of its own (Piirainen, Kolfschoten & Lukosch, 2009; Kleinsmann, Deken, Dong & Lauche, 2012), it is the stance of this thesis that to try to split collaboration skills into design social interaction and other social interaction, is in a sense similar to separating the human from the designer. To be a designer is a role, like a father, sister, coach or gamer; and the skills of social interaction are amongst human members of a team, person to person. In that sense, conflict and disagreements, whether they are about an aspect of a projected design outcome or not, are still amongst people's preferences, needs and interests. As mentioned before, mindfulness is not, by definition, a method to tackle a specific roadblock to efficient multidisciplinary design team communication such as mistrust or prejudice. One one end, it is obvious that those roadblocks apply to any other collaborative human endeavour. On the other hand, mindfulness is a skill about training to pay attention in a particular way to any object of attention that can be perceived. The development of this skill appears to enhance other capacities in the humans that practise it, thus permeating any role they play, including a designer role.

That is not to say that integrating design-relevant mindfulness applications within design settings is not useful. Quite the contrary. This study, along with others reviewed (Niedderer, 2013; Niedderer et al., 2017; Bosse et al., 2018; Bosse, 2019), has demonstrated that mindfulness interventions can be relevant and provide worth to diverse design contexts. What is

asserted here is that the way a mindfulness intervention is developed to be contextually inserted within a design process, probably has unlimited possibilities; but the mindfulness benefit occurs in the person and thus permeate and inform their role as designer, extending to the influence they may have over the discrete design setting or any other setting they have a role in. In other words, a mindfulness intervention can be designed to be relevant to design. The potential effects are to the human and thus to the designer role, not to the other way around.

This chapter explores how the study's findings argue for and support contributions to new knowledge; suggests avenues for further research and discusses potential implications to design.

6.2 First contribution

> *A design-relevant mindfulness-based intervention that generates rich and unique data about designers' evolving personal and professional values.*

This study's mindfulness-based intervention is an adaptation of the mindfulness process known as consciousness integration (Siegel 2010; 2012). Siegel's model is a mindfulness metaphor that encourages the discovery and enhances the perception of both the discrete and the interrelated qualities of elements of the Self as a system. In the original model, the elements of perception are described as 'senses':

- the five senses;
- the sixth sense (perception of the interior of the body);
- the seventh sense (thoughts, emotions, attitudes, beliefs); and
- the eighth sense (relationships).

According to Siegel, these 'senses' are meant to be observed from an individual's *observing self* or 'hub of awareness'. An *observing self* can be understood as the Self, or the perspective from which one is able to view our other diverse roles in life from a metaphoric 'outside'. Selves are understood as the diverse roles or identities in a person's life such as a designer, sister or friend. Psychology research literature explores the concept of the Self as constituted by multiple Selves (Higgins, 1987; Markus & Nurius 1986; Roberts & Donahue 1994). McConnell (2011) advanced a comprehensive framework that aimed to organise the diverse aspects of the Self and highlight how context-dependent Selves guide experience and behaviour.

To ensure direct relevance to design, the adapted *mindful design device* utilised designers' personal and professional values as objects of observation; and these are observed from the point of view of the *observing self*. This is inspired in the concept of design guiding principles (Lawson 2006) and in design literature that asserts the importance of values in design. Further relevance to design stems from the claim that mindful qualities emerge out of this practice to permeate relational contexts and foster interpersonal benefits (Siegel 2012; Parker, Nelson, Epel & Siegel 2015; Creswell 2017).

This first contribution comes in the form of a mindfulness intervention which is design-relevant and thus, a way of making mindfulness more explicit in design contexts. Furthermore, it captures multiple submissions of rich *precoded* data that can reveal designers' evolving personal and professional values. The process is simple to explain and to implement through an electronic form[1] that captures participants' submissions. A brief explanation of the concept of the *observing self* is ideal as part of the induction of subjects. Engagement with the tool consists of two reciprocal internal inquiries that invite participants to identify current values active in their perception, along with the personal or professional role to which such value is related. The way that the inquiry is performed follows a strategy of including receptive pauses in order to cultivate the skill of receptivity, and of encouraging the experience of differentiation between:

- the participant's *observing self* role (as they understand it);
- the other possible personal or professional roles or selves; and
- the values that emerge.

[1] Mindful Reflection Form (n.d.) Retrieved from https://goo.gl/forms/tCrC85FY7wAZB5Dj2

Participants are inducted into the practice through, not only, a brief overview of the concept of the *observing self*, but also of the potential value of mindfulness to creativity and innovation.

In short, the *observing self* is presented as a hub of awareness, or an individual role-less-role that is able to:

- observe one's own different roles or identities from a subject-object perspective;
- recognize (or differentiate) those aspects of the Self as discrete and unique; and
- recognize (or link) those aspects of the Self as part of a system of multiple elements conforming one Self.

Creativity and innovation are potentially benefited by mindfulness when viewed from a perspective of what happens in the process of designing. According to Hart et al. (2013), there are two phenomena associated with the creative process;

- emerging knowledge; and
- arising insight.

It is suggested that in designing, too much time is spent in emerging knowledge, rather than in arising insight (ibid), risking that the creative process becomes limited. This is illustrated in the following statement:

> *'We all work with what most people would either call (professional) intuition, 'know-how' or tacit knowledge, the knowledge base we have built up over the course of a design career. Paradoxically, this working method can be the worst barrier to product innovation.' (van der Merwe, 2017).*

The experiences of openness and receptivity are encouraged through engagement with the *mindful design device* in order to balance emerging knowledge and arising insight in designing. As part of the process, the participant is asked to reduce the emerging value reflection to one word and then submit the result of the internal inquiry in the form of:

- a personal or professional role (such as 'designer' or 'friend'); and
- a value (such as 'commitment' or 'discipline').

Table 14 contains a summarized version of the steps.

Table 14. Mindful Design Device Summarized Steps
Bring your awareness to your *observing self* as you understand it.
Ask yourself the following question: ‘WHAT SEEMS IMPORTANT NOW FROM THE PERSPECTIVE OF MY ROLE AS DESIGNER?’.
Pause and wait for the answer.
Again bring your awareness to your *observing self* as you understand it.
Ask yourself the following question: ‘WHAT ELSE SEEMS IMPORTANT NOW FROM THE PERSPECTIVE OF ANY OF MY OTHER ROLES IN LIFE?’.
Again, pause and wait for the answer.
Submit the answers in one-word form for each role and value (i.e. Role: designer | Value: Discipline; Role: Husband | Value: Commitment)

These engagements should happen daily or almost daily over a period of time. This will result in a rich mindfulness-based data set that reveals designers' evolving personal and professional values as they emerge, in

context with the particular design situation present during the time of the study. The reflection process clearly embodies a diverse set of mindfulness-based processes, such as the experiences of the concept of the *observing self*, of interrelatedness, of pausing, and of receptivity.

6.3 Second contribution

A qualitative method for categorisation of designers' evolving personal and professional values.

The second important contribution of this study is a qualitative theoretical categorisation method to analyse and develop a collaborative design values framework. Thematic coding (TC) is implemented as a flexible categorising process of thematic analysis (TA). TC is considered a 'school' of TA which explicitly incorporates grounded theory (GT) guidelines (Braun et. al, 2018; Rivas, 2018; Maxwell & Chmiel, 2014). GT is by definition a way to build theoretical analysis through data categorization (Charmaz and Smith, 2003). Literature also suggests that its methods support researchers when they are attempting to codify and publish their own method of theory generation (Glaser and Strauss, 1967). Charmaz (2008) explains that GT has evolved into many different associated methods as opposed to a single approach. Moreover, its guidelines are few and adaptable; so researchers have flexibility to not only choose methods but to create them to fit their inquiry needs (ibid).

Following this logic, this study adapted thematic coding guidelines to support the analysis of designers' values and develop theoretical categories in an academic collaborative design context. This adaptation constitutes the second contribution of this study in the sense that it outlines a systematic qualitative analysis method to develop theoretical categories of designers' evolving values.

This proposed method requires that the initial data consist of multiple submissions of role/value sets (i.e. husband: commitment; designer:

discipline) resulting from engagement with the *mindful design device*. This data collection approach follows a pre-structured emphasis by implementing an *a priori* model (also known as predetermined, *precoded*, pre-structured or pre-set) where initial codes drawn from the research questions are used as a guide to establish the context and potentially reduce classification inconsistencies (Crabtree & Miller, 2000; Saldaña, 2015; Lavrakas, 2008).

Collecting data in this predetermined or *precoded* way is understood in this study as *First Stage Coding.* The hybrid process for building theory follows two more coding stages: *Second Stage Coding* in order to form concepts; and *Third Stage Coding* in order to form categories. These stages are developed from GT guidelines that suggest that theory is built from concepts. Codes that relate to common themes are grouped together to form concepts; then similar concepts are organized to form categories (Strauss & Corbin, 1990; Allan, 2003). Charmaz (2008) states that coding consists of at least those two phases and refers to them as initial coding and focused coding.

Sumarizing, this study's coding stages for theoretical categorisation are:

- *First Stage Coding:* capture of *precoded* data.
- *Second Stage Coding:* initial coding to form concepts.
- *Third Stage Coding:* focused coding to form categories.

Charmaz (2006) says that, in GT, data must be scrutinized repeatedly throughout the process of analysis by asking both action and analytic questions as suggested by Glaser (1978). These questions are:

- Action: *What is happening here?*
- Analytic: *What category are these data a study of?*

Charmaz suggests that the first question propels a detailed examination of the empirical world often using gerunds like ‘waiting’, ‘being’, etc.; while the second question links this world to theoretical possibilities. The focused nature of this study led to a relevant adaptation of these systematic questions in order to analyse the data in context with the research question.

Values are understood in this inquiry as two aspects: attributes and/or aspirations; and the context of personal or professional values is established by asking participants to identify the *selves* (or roles) to which they associate a value. Thus, to directly fragment the data into the elements that constitute a value, and to begin examining the emergent concepts that led to final categories in context with designers’ personal and professional values, the action questions used to scrutinize the data under *'What is happening here?'* are:

- Is this a personal or professional value?
- Is this an attribute (understood as a quality, characteristic or trait); or an aspiration (understood as a desire, expectation or goal).
- If it is an attribute, what does it promote? If it is an aspiration, what does it desire?

The analytic questions used to scrutinize the data under ‘*What category are these data a study of?’,* are:

- *From the perspective of what kind of personal/professional role is this? And/or,*
- *From the perspective of this role, what kind of value is this?*

This coding and questions paradigm led to the theoretical categorisation method which constitutes this study's second contribution. For a comprehensive description see Sections 3.6.

Table 15 contains an example applying the adapted method proposed to interrogate the data. It utilizes as example a submission consisting of:

- a Self (or role): FRIEND; and
- a Value: COMMUNICATION.

Second Stage Coding answers the question *'What is happening here?'* by attempting to describe as a concept what the designer's meaningful concern or motivation is about. In this case it is a:

- personal attribute (the defining value aspect), that is
- promoting (action gerund) a
- forthcoming relationship (concept).

Third Stage Coding answers *'What category are these data a study of?'*, by attempting to establish a final category that groups similar concepts. Data is interrogated through the following analytic question:

- *From the perspective of what kind of personal/professional role is this? And/or,*
- *From the perspective of this role, what kind of value is this?*

Table 15: Coding Stages Example

First Stage Coding: *Precoded Data*	**Second Stage Coding:** *Initial Concept*	**Third Stage Coding:** *Self Category*	**Third Stage Coding:** *Value Category*
Self: Friend; Value: Communication	A personal attribute promoting a forthcoming relationship.	Personal / Relational.	Relationality: Personal or professional quality promoting harmonious or cooperative interactions in human relationships.

Utilising the described method, categories were developed for designers' *Selves* and for *Values*, that this study proposes as an initial framework for collaborative design settings.

6.4 Third contribution

> *A set of role and value categories constituting a framework of evolving designers' personal and professional values in collaborative design settings.*

Categories for designers' personal and professional *Selves* (or Roles) and *Values* were developed upon application of the proposed method adapted from GT guidelines. This framework, which is specific to collaborative design settings, constitutes the third contribution of this study.

This study presents the first mindfulness-based designers' values framework for the specific setting of academic collaborative design.

Roles (or Selves) were categorised into the following categories:

- Designer: Role as collaborative design academic.
- Non-design Professional: Role as a professional in a field other than design. (i.e. Filmmaker, Entrepreneur, Language Tutor).
- Personal Relational: Role within close personal relationships. (Sister, Girlfriend, Husband, Granddaughter).
- Personal Skill/Hobby: Role within leisure activities. (i.e. Runner, Knitter, Gamer).
- Personal Individual/Reflective: Abstract introspective roles. (i.e. Person, Me, Mental-self, Individual).
- Student: Role within graduate design student general academic experience.

Each of the role/value sets fell into one of the following categories and ultimately constituted a collaborative designers' evolving personal and professional values framework:

- ***Attributes***:
    - Efficacy: Personal or professional quality promoting the ability to produce a desired or intended result.
    - Relationality: Personal or professional quality promoting harmonious or cooperative interactions in human relationships.
- ***Aspirations****:*
    - Development: Desire for personal or professional continued learning or knowledge acquisition.
    - Achievement: Desire for personal or professional success.

Section 6.5 Fourth contribution

> *A focused set of perceived effects on designers' interpersonal and intrapersonal concerns resulting from engagement with the mindful design device.*

In order to report on the perceived mindfulness effects that designers reveal about their interpersonal relationships upon engagement with the *mindful design device*, participants were administered a qualitative survey question in the form of a final reflection to read:

> *In what way do you feel your interpersonal working relationships may have been influenced due to engagement with this practice?*

Based on research question RQ4: *'Does engagement with the mindful design device have an enhancing effect on designers' interpersonal relationships?',* a conjecture was elaborated to test against participants' final reflections upon the experience of engagement with the *mindful design device*:

> *Conjecture:* ***Upon engagement with a mindful design device, designers will recognize improvements in their interpersonal relationships.***

Besides reflecting on the effect in interpersonal relationships, and possibly because of the open-endedness of the question, participants chose to also share effects about their experience and perceived effects with the *mindful design device* that were not specific to interpersonal relationships. The basic suggestion of the conjecture is that designers will recognize and

describe potential improvements that they perceive to be caused by their sustained mindfulness exercise. The reflective question is specific towards the correlation between mindful reflection and any perceived influence on interpersonal relationships.

Output stemming from that reflection was analysed following a qualitative process consisting of:

- conjecture and refutation for initial categorisation;
- qualitative coding for development of themes; and
- framing of the data around literature-supported mindfulness effects relevant to design concerns.

The process of analysis of the data revealed that, although many of the participants did, not everyone perceived or chose to share effects specific to their interpersonal relationships only, or at all. In fact, many of the participants chose to either include or only share other effects that were not specific to interpersonal relationships, although arguably, having a potential influence on relational contexts. Thus the data showed other complementary components to mindful reflection effects in this context that were not described in the initial conjecture.

Stemming from the analysis of participants' submissions, the original conjecture was refuted directly by some participants, and found to be incomplete. A revised, data-informed conjecture statement was sought to include a more accurate description of the most prevalent mindfulness benefits. From the initial overview of the new data-driven information, a transitional statement was constructed to embody the new suggested effects stemming from a framing of the statements around the mindfulness benefits developed from relevant literature.

The new mindfulness effects were analysed further to find similarities and explore the possibility of a more concise affirmation. A deeper analysis of these themes framed around the observed mindfulness effects yielded a more succinct categorisation. Effects were arranged into two final focused categories:

- Becoming more aware of *intrapersonal* and *interpersonal* aspects; and,
- Becoming more aware of the impact of self-awareness on *intrapersonal* and *interpersonal* aspects.

From the critical analysis of the new data-driven information, a final statement was constructed to embody the new categories of suggested mindfulness effects:

> ***Upon engagement with a mindful design device, designers can experience mindfulness benefits by becoming more aware of intrapersonal and interpersonal aspects; and by becoming more aware of the impact of self-awareness on intrapersonal and interpersonal aspects.***

Increased awareness is evidenced for each dimension in specific ways and foster more focused conclusions such as: (a) becoming more aware of *intrapersonal* and *interpersonal* aspects; and, (b) becoming more aware of the impact of self-awareness on *intrapersonal* and *interpersonal* aspects. These focused effects suggest a transformation, upon engagement with the *mindful design device*, in the way interpersonal and intrapersonal concerns are conducted in collaborative design contexts. Section 6.8 discusses potential implications of such effects on design collaboration.

6.6 Limitations of the Research

This study was conducted in a collaborative context of design academics. Whilst the mindfulness-based method that generates unique data can potentially be implemented on diverse design contexts, the categorization results of the analysis, and the participants' perceived impact reported upon engaging with the mindfulness intervention, should only be associated with design in the setting from which they originated. However, whilst this is a limitation of the claims specific to this thesis' data, implementation and analysis in order to inform about other design settings is a possible avenue for further research.

Mindfulness interventions in research are diverse, and vary in style, dosage and length of practice. Whilst this study's mindfulness intervention is well supported by literature, there is reported contradiction and confusion (Hart et al. 2013) about descriptions and applications of mindfulness in research contexts.

Thus, this study's mindfulness intervention does not intend to represent mindfulness as a general concept. Instead, it is viewed as an application and adaptation of a particular approach to it. Therefore, the application of this programme's developed *mindful design device* can only assert the suggested benefits stemming from this study's particular nuances.

Finally, this study adopts a qualitative methodology approach. Mindfulness disposition is often measured in research with validated quantitative methods which require certain numbers of participants in order to ensure statistical significance (Baer 2006; Baer, Samuel & Lykins 2010; Baer, Smith, Lykins, Button, Krietemeyer, Sauer & Williams 2008). Whilst this

thesis presents rich qualitative data suitable for a case-study, the sample size would need to be larger in order to include quantitative-based methods (Delice 2010).

6.7 Further research opportunities

The following is an outline of avenues that future research can take based on this study's limitations and findings:

1. Further research can potentially expand our understanding of how values emerge and evolve in diverse design settings and career stages by implementing this study's theoretical categorisation methodology to other design contexts. A limitation of this study is that its findings are specific to the collaborative context of design academics. The potential and significance of the proposed methodology is that it begins a conversation around what values are impacting designers' decisions. Thus, it opens research opportunities in order to create expanded and context-specific mindfulness-based designers' value frameworks. Multiple designers' value frameworks can eventually contribute to rich mapping of what drives designers in different applications and junctures of design.
    a. The theoretical categorisation methodology suggested in this thesis can potentially be refined further in the precoding stage in order to strengthen the context of value understanding. This can be done by letting participants decide and choose whether the value submitted is an attribute or an aspiration, so that the context of the submission can be established more clearly.

2. Based on the concept of the Dynamic Stakeholder Tool (see Appendix G), researchers can develop multiple centres of inquiry guided by each different value category in this study's proposed

values framework. This can potentially unveil and stimulate expanded reflection upon unseen aspects of a designer that may represent areas for individual development opportunity in collaborative design academic contexts.

3. A number of further research opportunities emerge from expanding aspects of this study with larger participant samples in order to implement complementary quantitative methods for data analysis. Whilst this thesis presents rich qualitative data suitable for a case-study, the sample size would need to be larger in order for it to be statistically significant. Some of these opportunities are as follows:
    a. The frequency ranges pertaining to this study's value categories appear to suggest that *Efficacy* and *Relationality* values emerge as meaningful significantly most often (See Appendix C, Section C.3). Thus, they arguably constitute the source of most impacting values into design decisions in the context of collaborative design. According to this apparent inclination it can reasonably be suggested that, for designers in a collaboration setting, attributes are most meaningful which: (a) promote competencies that are geared towards efficiency and results; and (b) promote harmony, consensus or rapport in interpersonal relationships. To be effective and/ or efficient, and to display cooperative qualities in settings where collaboration is needed, appear to be crucial motivators impacting design decisions. Further research can apply the *mindful design device*, and the data collection and analysis methodology presented in this thesis to a larger group to include statistically significant measures. These can

potentially clarify whether these tendencies persist in collaborative design.

b. This study claims that upon engaging with the *mindful design device*, increased awareness is evidenced for each of these dimensions: (a) becoming more aware of *intrapersonal* and *interpersonal* aspects; and, (b) becoming more aware of the impact of self-awareness on *intrapersonal* and *interpersonal* aspects. Future research in a larger group of participants can determine if there is any sense of the strength of these facets of awareness in relation to each other. This can potentially illuminate those effects which are more prevalent and propel an understanding of where mindfulness has greater impact.

c. A future quantitative study could seek to establish whether the design-relevant mindfulness device yields significant transformational and correlational results in collaborative design contexts (See Appendix C, Section C.2). Such results can be considered in the context of both general and discrete tendencies towards: (1) mindful awareness; and (2) cooperation. This is possible with the application of two instruments, widely recognized in research, measuring each five facets of mindfulness and five facets of modes of conflict-resolution respectively. The mindfulness instrument is known as the Five Facet mindfulness Questionnaire (FFMQ) and has been used in numerous mindfulness studies (Park, Reilly-Spong & Gross, 2013). To address cooperation, a conflict-resolution instrument, known as the

Thomas-Kilmann Conflict Mode Instrument (TKI), would be suitable as it has been refined over 40 years to reduce social desirability bias (Kilmann & Thomas, 1977). It would be reasonable to assert that a tendency towards cooperation would be a more desired quality in a collaborative design context. Transformation can also be measured in the context of discrete or individual facets of mindfulness, and of modes of conflict-resolution. Potential correlations can then be drawn upon the measured results of individual facets and modes as described, to enable conclusions specific to the relationships between discrete elements representing tendencies towards mindful awareness and towards behaviour in situations of conflict.

d. Finally, a potential claim specific to the relation between the commitment to a mindfulness practice and its effects can potentially be explored in a future quantitative study. This researcher developed an interest in assessing whether transformation of values was evidenced during the study period. In other words, did the frequency of specific values emerging as meaningful, change over the course of the practice? An overview of the data appears to suggest that the categories of values that emerge tend to stay in the same general frequency level throughout the study period. There does not appear to be a significant change as a consequence of the practice. Yet, there seems to be a significant difference in the frequency of values in the category of *Relationality*, that correlates with the level of engagement of the participant over the practise span (See

Appendix C, Section C.4). If this is confirmed in future quantitative studies with statistically adequate samples, it could suggest that the level of commitment to a mindfulness practice, has a direct effect in the category of values that emerge which have to do with the quality of interpersonal relationships. This is directly relevant to collaborative design concerns.

6.8 Final Reflections

This section explores potential implications of mindfulness to collaborative design activity through transformation of interpersonal concerns. Howard & Melles (2011) suggest that mindfulness is a competence that should be explicit in design academic settings to support contemporary co-creative approaches. Some other mindfulness benefit possibilities to collaborative design settings are:

- development of adequate co-creative capability to allow for socially responsible action; promotion of co-design output that is more 'co-owned' and addresses 'real human needs'; promotion of ecocentrism in co-design teams (Vyas et al. 2012);
- promotion of trust and empathy in co-design; ecocentrism as an inclusive design-with communities approach; reduction of *metic* tendencies that could compromise ethics and egocentrism in multidisciplinary design contexts (Young 2012);
- promotion of behaviour change (Niedderer 2013);
- becoming aware of unconscious worldviews and tacit assumptions (Young, Blair & Cooper 2001);
- transcendence of paradigms that separate *prefigured boundaries* such as *self* and *other*; attunement to relational dynamics which situates the designer in *inter-relatedness*, builds awareness of the multiple dimensions where designing happens, and forges aware relational connections that bring forth openness; pursual of uncertain paths towards openness, welcoming of the chance to be open for contingency, and becoming together through interrelatedness (Akama, 2015);

- embracing of the influence, interventions, disruptions, tensions and uncertainties brought to bear by other things and people (Akama & Prendiville 2013).

In short, the concept of mindfulness surfaces in design literature as a potential way to promote:

- collaboration,
- harmonious interpersonal relationships, and
- desirable behaviour.

The findings in this study support the claim that mindfulness can stimulate transformation, in the form of increased awareness, of both intrapersonal and interpersonal aspects of the designer.

Said another way, (a) unconscious outlooks; (b) beliefs and (c) emerging experiential knowledge, which are predetermined in the process of designing and which impact design decisions, are brought to the surface of awareness. It has been suggested in this document that the prevalence of emerging knowledge which drives intuition can be balanced by mindfulness by fostering the skills of receptivity and openness to arising insight, thus nurturing the potential for innovation. Moreover, if interpersonal relations can be enhanced, it can positively influence design collaboration.

The term alchemy denotes a certain internal or metaphoric molecular transformation. In design instances where collaboration is intrinsic to the process of designing, mindfulness can potentially be an alchemical catalyst. The forces at play in design collaboration which respond to

personal and professional values, are tacit. In other words, they have a direct effect in relational outcomes, yet they are largely invisible.

This study's findings suggest that mindfulness can support relational transformation. These effects can be summarized as:

- increased awareness that leads to clarity,
- desirable behaviour towards team members, and
- conscious receptivity to aspects of the self and of others.

Out of these effects, an alchemic response can ensue, that precipitates transmutation of collaborative design endeavours. The systematic programme of qualitative research conducted in this thesis suggests that when tacit influence is reduced through mindfulness, cohesive and ecocentric behaviour can be stimulated. As expressed in the genesis of this project, this researcher argues that a possible perspective into the way mindfulness causes impact is that it nurtures the resurfacing of an underlying intelligence which has the tendency to support balanced and symbiotic interaction.

Appendix A
PUBLISHED PAPERS

Although the amount of design literature considering or focusing on mindfulness directly is relatively small, there appears to be noticeable interest in the design academic community.

This is evidenced in the peer feedback below for academic papers the researcher has authored and co-authored, as well as in the reasonably active interest in such papers uploaded to the academic online platforms Academia.edu[1] and Researchgate.net[2]. As of the date of completion of this document, the researcher has authored a total of five (5) academic conference papers. Although all of them explore the intersections of design and mindfulness, the most recent three (3) were published in direct reference to, and as part of the development of this doctoral programme.

The papers contained in the following pages are:

1. **Paper-1**: Rojas, F., Spencer, N. & English, S. (2012) Stillness as a Competence of Design Intelligence.
2. **Paper-2**: Rojas, F. (2013) Enhancing structured reflective practice to complement the “Design Praxium” vision.
3. **Paper-3**: Rojas, F., English, S., Young, R. & Spencer, N. (2015) Making Mindfulness explicit in Design Education.
4. **Paper-4**: Rojas, F., English, S., Young, R. & Spencer, N. (2016) Bridging Mindfulness and Design.
5. **Paper-5**: Rojas, F., English, S., Young, R. & Spencer, N. (2017) A design-relevant mindfulness device.

[1] (n.d.). Retrieved from https://northumbria.academia.edu/fmrojas
[2] (n.d.). Retrieved from https://www.researchgate.net/profile/Fernando_Rojas9

These papers systematically explore ways of understanding mindfulness as well as its suggested correlation to design concerns. Hence, they represent a systematic record of the review of the intersection of design and mindfulness.

Table 16. Published Papers Feedback Excerpts

Anonymous feedback from peer reviews of the Researcher's published papers. These examples pertain only to the level of interest in the topic of mindfulness and design evidenced in the reviews, and do not include other feedback specific to other paper publishing aspects:

1. *To discuss this text would be an enrichment for the conference and for your approach.*
2. *I have found this topic to be of great importance in design education.*
3. *I strongly support this type of research into what is a very difficult approach to understanding 'design affordances', since affordance in this case applies to the 'subjective self' and its capability of in-depth observation and constructing its own knowledge.*
4. *If a designer has to acquire the ability to "redefine and change the problem as given, in the light of solutions that emerge in the process of designing", then a space of 'stillness' has to be found (designed by the seeking self) that goes beyond the normally accepted definition of 'reflection'.*
5. *The paper presents and unravels a topic that is relevant and timely in a rapidly-changing landscape, both professionally and scientifically.*
6. *The topic is discussed through a systematic construction that holds well in the face of the identified challenges and in-depth literature review presented and addressed.*

7. *The paper is well-written and resourceful. If anything, it would be useful to follow possible translations of the presented formulation into contexts of application: this is ultimately where this reflective and exploratory study may find its tangible validation.*

8. *The paper presents seriously a topic of relevance, clarifying concepts in a clear and reasoned manner.*

9. *I do not propose changes and I'm interested to know future developments.*

The next pages contain all papers as they were published.

DRS 2012 Bangkok
Chulalongkorn University
Bangkok, Thailand, 1–4 July 2012

Rojas, F., Spencer, N. & English, S. (2012).
Stillness as a Competence of Design Intelligence

Stillness as a Competence of Design Intelligence

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According to Cross (2006), designing can be viewed as a form of intelligence so that its competences can be identified, clarified and cultivated. This paper reviews and extends existing design literature by refining the language that describes design-intelligence and the identification, clarification and cultivation of design-intelligence competences. This document also reports on an initial study that used an Enhanced Reflective Practice Reporting Template within the context of professional practice to highlight: a) the value of improving a designer's professional inner self-awareness through reflective practice enhanced with non-analytical mental training techniques, and b) that such processes can aid access to a range of mental states helpful for coping with design uncertainty. Furthermore, the concept of 'stillness' is introduced and discussed, as a competence of design-intelligence to develop a designer's dynamic self-awareness, and to manage the experience of the effects of design uncertainty resolution. This paper concludes that improved inner self-awareness and the ability to recognize and access mental states of stillness can help designers to become present to the possibility of transforming both themselves and the world through design; thus enabling a fuller appreciation of the creative potential in design situations. It is also proposed that deeper aspects of the experience of stillness may extend its reach to wider social contexts.

Keywords: Stillness; Reflective Practice; Design Intelligence; Uncertainty

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1.0 Introduction

Living in the mud of a design problem produces both pleasure and pain. Currently, design research recognizes the diverse experiences arising from designing in ill-structured and ambiguous professional situations of practice. However, currently there is no empirical design research that has sought to investigate the relationship between how situations of practice are experienced and the influence of this for designers' professional self-awareness.

This discursive paper aims to improve understanding about the dynamic development of designers' professional self-awareness. This research focuses on the experience of designing and managing the effects of uncertainty in design practice situations. As such, the research is not bounded by design practice phases or stages, or by domain specialism. This work contributes to the understanding of Design Epistemology (Cross, 1999) and the understanding of the Reflective Practice model of the designer (Schön, 1987), by refining the language for describing design-intelligence and stimulating debate on the identification, clarification and cultivation of design-intelligence competences.

According to Cross (2011) it is useful to view designing as a form of intelligence so that its competences can be identified, clarified and cultivated. This paper highlights that design literature suggests numerous aspects of design-intelligence that spread across the multiple intelligences as proposed by psychologist Howard Gardner (2011). It is also illustrated that there is currently little understanding or discussion about how to clarify and cultivate specific design-intelligence competences.

This paper also reports on insights arising out of a pilot study. This study considered structured cycles of Reflective Practice from a Visual Communication professional practitioner during engagement with a Design Practice Master of Arts. Insights arising from this pilot study point to the value of developing a designer's dynamic self-awareness through reflective practice enhanced with non-analytical mental training techniques. Furthermore, 'stillness' is introduced as a competence of design-intelligence, which can be identified, clarified and cultivated and resulting from Enhanced Reflective Practice. It is argued, that this process can help a designer become less fixated to concrete models of thought, and become open to multiple perspectives in a design situation. It is also suggested that such a process can aid in accessing a range of mental states potentially helpful for coping with designing's inherent uncertainty.

2.0 Theoretical Context

This research investigates the role, benefits and cultivation of 'stillness' in the experience of design practice. It is argued that stillness is a personal way of knowing that supports the development of dynamic self-awareness. This can be viewed as an ability to access a range of mental states that are characterized by: considerably reduced habitual reaction and non-attachment to uncontrolled streams of thought; and by mindful awareness and acceptance of a designer's inner condition, and of perception of the present circumstances. In this section stillness will be positioned in relation to discussions about Design Intelligence, Uncertainty in Design and Reflective Practice.

2.1 Design Intelligence

If, in a broad sense, intelligence[1] can be understood as an umbrella-term for a superior mental ability to interact with an environment; and if environment includes the physical and social aspects of situations of professional practice; then, it can be argued that design-intelligence encompasses the mental abilities that afford success within the 'environment of design'. Many researchers within the design research community have acknowledged and discussed intelligence characteristics that designing combines: thinking and feeling (Papamichael & Protzen, 1993), the rational and the non-rational (Cross, A., 1986), and the logical and the intuitive (Swann, 2002; Cross, 2006). Papamichael and Protzen (1993) offer a theory of design-intelligence as being only partially rational. They suggest that designing is thinking and feeling while acting, and that designers feel the relative importance of design criteria, reformulating it as they compromise between what is desired and what is possible. Swann (2002) refers to elements of design problem solving as 'the traditional root of intuition', 'inspired guesswork', and 'holistic thinking'.

As Cross (2006: p. 41) highlights, there appear to be aspects of design ability that can spread through the six forms of intelligence that Gardner (1983) distinguishes - linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, personal - which does not always give a satisfactory understanding of designing from the perspective of intelligence. In this paper, we are not aligned to Spearman's (1904) concept of General Intelligence: intelligence as a single entity. Gardner's (2011) theory of multiple intelligences, Sternberg's (1988 & 2000) work on the three fundamental aspects to intelligence and Goleman's work on 'emotional

[1] **The authors find that for clarity it will be useful to expand the context of intelligence as far as it relates to this paper. One of the definitions of 'intelligence' appearing in the Merriam-Webster's Dictionary, and useful for substantiating the meaning terrain of this paper, is: 'the ability to learn or understand or to deal with new or trying situations'. 'Ability' is defined as 'competence in doing', and several related words are used interchangeably to define each other: 'ability', 'competence', 'capacity' and 'skill'.**

intelligence' (1996 & 1998) and 'social intelligence' (2007) can be more useful for thinking about designing as a form of intelligence. It is, however, important that in an effort toward pluralization that intelligence is not confounded with other virtues. In this light, Gardner (1999) makes a distinction between intelligence and creativity. In describing the difference, he states that:

> *Creativity includes the additional category of asking new questions – something that is not expected of someone who is "merely" intelligent… the creative person is always operating in a domain or discipline or craft… the creative individual does something that is initially novel, but the contribution does not end with novelty… Rather, what defines the creative act or actor is the ultimate acceptance of that novelty (pp. 116-117).*

This view places the evaluation of creativity externally to the individual, with the field, the market or with society as a whole. This is useful as it helps make a distinction between: a) the use of imagination and intelligence in the creative event to transform the individual in the development of an object of design, and b) the transformation of a field by the introduction of a novel or creative object of design.

Cross (2006) makes the argument to separate out design ability as a form of intelligence in its own right and appears to use the concepts design-ability and design-intelligence interchangeably. He further states that 'viewing designing as a form of intelligence is productive, it helps to identify and clarify features of the nature of design ability, and it offers a framework for understanding and developing the nurture of design ability' (2006: p. 43). He does not offer guidance on how to develop understanding specific to the identification, clarification or development of design ability, which is a clear area for further research. Cross (1990 & 2006) describes design features that can be considered aspects of design-intelligence. He states that designers must be able to: 'produce novel, unexpected solutions'; apply 'imagination and constructive forethought to practical problems'; use 'drawings and other modeling media as a means of problem solving'; 'deal with uncertainty and decision making on the basis of limited information'; 'resolve ill-defined, 'wicked' problems'; adopt 'solution-focused strategies'.

If we accept the position of Cross and if design-intelligence has such features, then, what are the personal competencies, skills or traits that are the markers for successful displays of design-intelligence? What, for example, are the personal competences, skills or traits that allow one to deal with uncertainty and decision making on the basis of limited information? This is one ability described by Cross, that the authors

understand as referring to personal knowledge, the way designers relate to their experience, or the management of uncertainty.

When considering success in the environment of design, it is fundamental to regard the context within which uncertainty operates in design literature. Defining features of an environment of design and the context for design-intelligence are that: designing always involves engagement in uncertain, ill-defined and ambiguous situations of practice; that these situations are continuously reformulated through solution-focused approaches; and that mental states and bodily sensations inform rational and non-rational cognition (Rowland, 1992; Cross, 2006; Schön 1983 & 1987; Spencer, 2008). In this light, if design-intelligence encompasses mental abilities that afford success within the 'environment of design', then the overarching framework of design-intelligence must consider competences that designers display in uncertain situations.

If, accessing a range of mental states, and managing the uncertainty of designing, can be considered within the context of design-intelligence, then it is useful to conduct research regarding the development of those abilities and their potential for transforming the individual and the field. This leads to a research question: is stillness an effective mental ability for helping a designer deal with uncertainty and decision making on the basis of limited information?

2.2 Uncertainty in Design

Research suggests that the way uncertainty is assessed by a designer is through a felt emotional experience. Spencer states:

> *As expert designers engage with a professional context that is uncertain, ill structured and ambiguous they personally experience uncertainty. As the uncertainty of the challenge is grasped, fear develops about their ability to resolve the design problem's issues and exploit its opportunities (Spencer, 2008: p. 285).*

It can be argued that emotional peaks and valleys have to be directly related to a designer's point of view of the circumstances of the situation at hand. All designers will not react the same way to the same characteristics of a design situation. Yet, it can be stated that, albeit in different degrees and for different reasons, uncertainty has an effect in designers. Cross (2011) suggests that coping with uncertainty is a key factor in design ability, and that:

> *In order to cope with the uncertainty of dealing with ill-defined problems, a designer has to have the self-confidence to define, redefine and change the problem as given, in the light of solutions that emerge in the very process of designing (p. 148).*

Cross refers to the aspect of the design experience that is shaped by design problem and solution generation cycles. There are, nonetheless, other uncertain situations of design practice that are just as present in a designer's experience. Beyond doubts about the possibility of arriving to a creative solution or attachment to a solution concept; there might be doubts about recognition and approval by clients, peers or users; doubts about the ability to satisfy time or economical constraints; doubts about legal and production feasibility; doubts about the separation between the project's purpose and reach and the designer's own values and principles. Lawson (1997) makes a similar point stating that the designer has worries and uncertainties about a future that is beyond the proposed design solution. Worries beyond solution propositions include, but are not exclusive to, client approval, legislator and regulator endorsement, economics and market popularity.

It is clear that in design, uncertainty is a recognized element; that coping with uncertainty is considered key in design ability; that beyond arriving at a final creative solution there are a series of additional uncertain situations of practice; and that uncertainty can generate emotional fluctuation. In fact the design experience has been described in various ways that illustrate this point. Lawson (1994) says that design is 'painful and frustrating, but ultimately extremely satisfying'; and Cross (2006) points out that 'it is risky, it is not comfortable and it is not easy'. Davies & Talbot (1987) speak of a certain knowing when an idea is right where feelings are pleasurable and ecstatic. Cravino (2009) indicated that highly creative people are not necessarily the most intelligent, but those who posses a high level of self-esteem, with no fear of being the object of criticism and scoffing. Spencer and Hilton (2010) highlight the value of 'the designer's ability to engage uncertainty and manage mental and emotional states' (p. 3). These mental states range from chaos and the experience of uncertainty and fear, to high levels of excitement and 'euphoric buzz' that may induce loss of perspective and disrupt good design practice (Spencer, 2008: p. 216). Sensed perception of these states as they relate to current circumstances, constitutes the condition of the inner-environment or experience of the designer while they perform in an environment of design.

Design research has made progress in describing the environment of design, the ill-structured and ambiguous nature of design problems and the experience of uncertainty in design. What is needed is further understanding about the personal competences, skills and traits that lead to successful and less-successful design performances. If coping with uncertainty is a key factor of design-intelligence, and if uncertainty is usually associated with the experience of emotional fluctuation and disquiet, then stillness may offer a way to potentially build the confidence to engage design uncertainty.

2.3 Reflective Practice

Schön (1987) considers Reflective Practice as important for the acquisition of professional artistry and skill and regards 'artistry' as 'an exercise of intelligence' and 'a kind of knowing'. Within the framework of Reflective Practice he describes intelligent action that is skillful and tacit as 'knowing-in-action'. Then, akin to the concept of solution-focused design problem solving, he introduces 'reflection-in-action' as on-the-spot experimenting in an action-present when unexpected results arise. According to him, the recognition of uncertainty provides the opportunity to respond with reflection, which transforms knowing-in-action to reflection-in-action. This synthesis is, in our view, the paradigm of design-intelligence. Cross (2011) regards reflection-in-action as the intelligence that guides intuitive behavior and considers the intuitive features of design ability as the most relevant to the nature of design. If by intuitive, Cross, means that there is little or no rational thought associated with the process and that action is guided by the qualities of ones sensations, then, stillness and the skill of being mindful, attentive and present to ones feelings is important within Reflective Practice inquiries. In this light then, stillness, would make a positive contribution if considered part of the structure of solution-focused solving of ill-defined problems.

Spencer and Hilton (2010) highlight abilities that they claim influence the effectiveness of a Reflective Practice inquiry. One of those abilities is:

> *The designer's ability to engage uncertainty and manage mental and emotional states – the confidence to feel the discomfort of uncertainty; the willingness to repeatedly explore alternative frames and solutions and expose the coherence of the thinking structure to criticism, time allowing, or to commit – i.e., appropriate application of the practitioner's mental and emotional resources' (p. 3).*

This analysis by Spencer and Hilton provides a further framework for positioning stillness as a competence of design-intelligence. Stillness, as a mental state that allows the designer to be present to, and content with, the discomfort of uncertainty, would allow a practitioner to engage repeatedly in the exploration of alternative frames and solutions. Mental stillness would, therefore, support design practitioners in the appropriate application of mental and emotional resources, and promote confidence during Reflective Practice inquiries.

English (2011) suggests that reflection in multiple perspectives, as part of Reflective Practice, has benefits that can potentially be expanded to deeper aspects of a designer's self-knowledge. Multiple perspective reflection informs about process through hindsight description and analysis; and can transform professional self-awareness and thus future

actions, by shedding light upon habitual actions that can be modified - as English (2008) suggests - to 'remove barriers to accomplishment'. Non-analytical meditative techniques, integrated as part of multiple perspective reflective cycles to encourage stillness, can potentially improve self-awareness further, by informing about, and transforming a designer's inner environment. It could be argued that a designer's inner condition is the source of a designer's actions, and that those actions are as habitual or as mindful, as the level of a designer's inner self-awareness. We contend that, how designers perceive their experiences of uncertainty resolution is an important factor for determining a designer's quality of professional self-awareness.

3.0 Pilot Study Insights

The pilot study's data consisted of cycles of reflective practice reporting. The thesis was that: a) the depth of the connections between 'being'; meaningful philosophical world-views and values, and 'doing'; design practice principles and actions relate directly to perceived levels of positive professional self-awareness and fulfillment; and b) that deep positive connections result in design professional practice harmony. The purpose was to inform understanding about a range of mental states that promote dynamic self-awareness and support management of design uncertainty. The study sought to answer the following research question: What are the personal competences, skills or traits that allow one to deal with uncertainty and decision making on the basis of limited information?

The research and its reflective cycles were undertaken while completing a Master of Arts program (Rojas, 2011) that holds Schön's (1987) view that professional education should enhance a practitioner's ability to reflect. Furthermore, it encourages its students to develop a structured Reflective Practice reporting discipline by implementing action research reflective cycles (English, 2008). This study's reflective output demonstrated that the practitioner favored engaging with reflection in moments of emotional peaks and higher turmoil. Moreover, the narrative sought to consider possibilities of better management of such moments. Two important aspects of this reporting were observed: a) the effects of uncertainty were a frequent source of reflective output; and b) the very discipline of reflection seemed to fulfill both the purpose of informing about such uncertainty effects, while at the same time hold the potential of transforming the designer's perception of them.

Over a 6-month period, the research evolved an Enhanced Reflective Practice Model Template incorporating analytical multiple perspective reflection; and non-analytical techniques inspired by meditative-disciplines

[for an example, refer to Figure 1]. The integration of non-analytical mental techniques within a Reflective Practice process was inspired by literature on the concept of meditation and its potential benefits (Nhat Hanh, 1979; Austin, 1999; Wallace, 1999; Spencer 2010). Spencer states that 'meditation is a gentle effort to be still', and that 'central to the experience of gradual stillness is acceptance' (2010: pp. 261, 262). He further maintains that 'being still is an experience where the mind appears not to react to the content of experience, where one does not actively and willfully generate 'deliberate thought' (p. 262). A narrative analysis of this study's data indicated the value and potential impact that this form of Enhanced Reflective Practice reporting could have upon a designer's professional practice and professional self-awareness. And also how this self-awareness can directly influence professional decision-making. From this analysis, the following insight was developed:

- **Insight 1** - Action research, through reflective practice reporting, can be enhanced with mental training techniques inspired by Wisdom Traditions[2] leading to improve professional self-awareness.

The potential of acting on Insight 1 is that practitioners may learn to concurrently hold, observe and consider multiple points of view with non-attachment to their reactions. If more possibilities of framing a situation are available in a designer's consciousness, it may be possible for that individual to avoid mental attachment to, and favoring of, a particular perspective or point of view; or mental aversion to, and avoiding of, a particular perspective or point of view.

[2] These are understood as meditation-inspired disciplines for the development of inner self-awareness, such as Mindfulness and Self-Observation. The inclusion of practices inspired by these disciplines illustrates the attempt to honor and integrate personal aspects of the self in professional practice scenarios, yet they are not considered for their religious or philosophical adherence. Rather, they are regarded for their potential utilitarian benefits and as tools for improving practice. Having said that, it is believed that eco-centric tendencies (which seem to be one of several side-effects of meditative disciplines) are human qualities necessary in contemporary design practice. Meditation approaches (especially Mindfulness) have been the subject of many serious research studies with a variety of published benefits. In the spirit of maintaining clear context, these meditative-disciplines as they relate to the pilot study, are understood as promoting self-aware states of mind where habitual reaction and attachment to uncontrolled streams of thought is reduced considerably, and where a state of mindful awareness, non-resistance and acceptance of the present circumstances, or presence, is achieved.

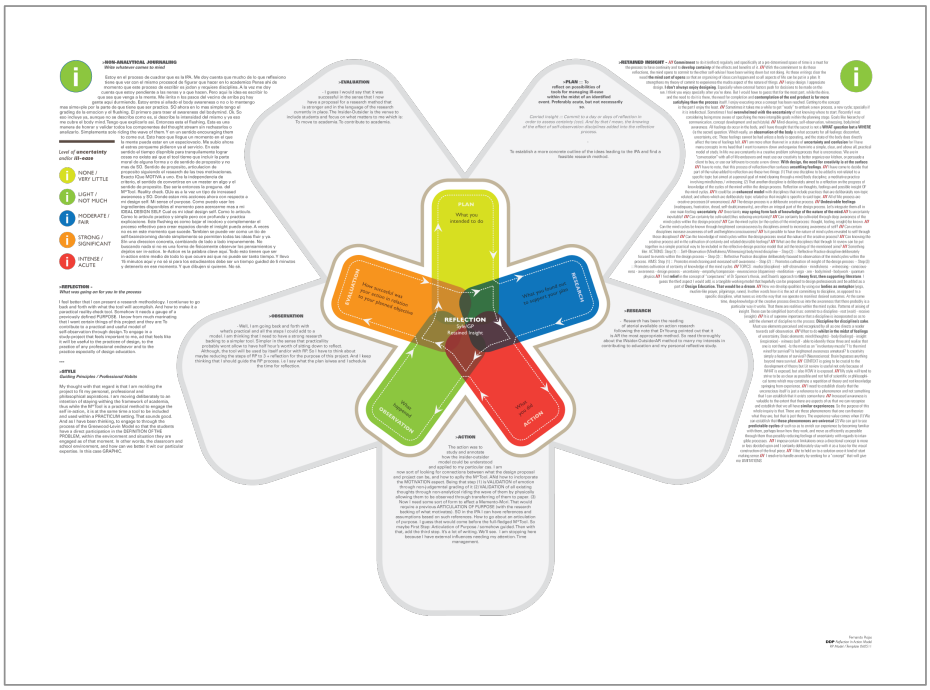

Figure 1

Enhanced Reflective Practice Model Template incorporating mental training techniques inspired by Wisdom Traditions. The original reflective moments as presented in the structure of the MA are: plan, research, action, observation, evaluation, and reflection. These are all analytical. The meditative techniques incorporated are: (1) Non-analytical journaling; a cathartic approach to quickly writing whatever comes to mind; and, (2) Self-observation of the perceived level of emotional fluctuation as an effect of uncertainty before and after reflection. The addition of these non-analytical techniques allowed for self-observation of the designer's inner environment and offered the possibility of experiencing self-aware states of mental stillness.

It may appear that this is to recommend avoiding or countering intuition but that is not the case. This approach is concerned with unconscious habitual reactions that may inhibit exploration and investigation. It is an inclusive acknowledgement of: a) the details of a design situation; b) the designer's value judgments of such facts, and; c) the third element, the witness who observes from a space in-between. Therefore, the environment of design, and a consideration of the multiple perspectives of a design situation, should include a designer's dynamic awareness, assessment and potential transformation of their own inner environments.

The pilot study's narrative evidenced the observation of emotional peaks related to design uncertainty emerging as a repeating theme. As a consequence a mapping tool was developed to facilitate awareness and reflection [for an example of design practice emotional mapping, refer to Figure 2]. Use of this tool allowed the reflective practitioner to: recognize the variants and different qualities of emotional peaks; gain awareness of the areas of the design process that constitute significant physiological responses; and to develop a sense of familiarity and reduced resistance and mental attachment to them.

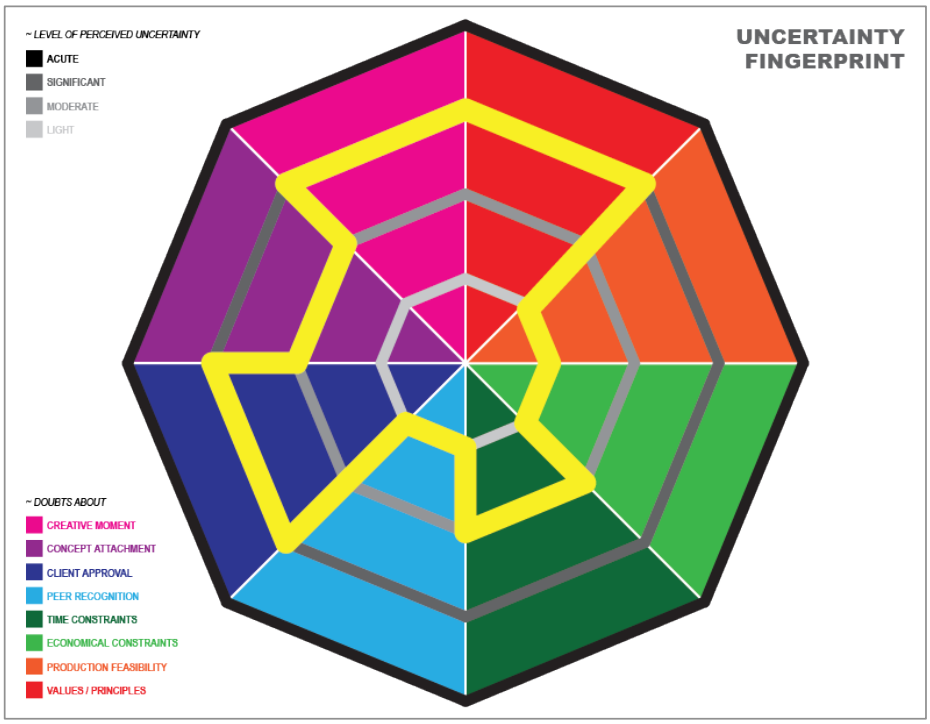

Figure 2

Awareness fingerprint of a designer's physiological response as it relates to uncertain situations of practice. This model was created upon reflective hindsight on the views presented in the pilot study's reflective narrative. This figure aims to visually represent levels of generally perceived emotional fluctuation while engaged with different aspects of the design experience.

Through the reporting process and further reflection it was concluded that, while in the acts of practice, these emotional peaks could often distract from the design task at hand and if experienced intensely debilitate. It may be argued that these reactions to the situation of practice are the body's mechanism for insisting on a break or for drawing the practitioner's attention to something important. The authors' view is that, beyond the specific reason and in different degrees, emotional fluctuation is a tangible experience of all uncertainty resolution. This lead to:

- **Insight 2** - Design practitioners would benefit from the development of tools that promote new conditions of inner self-awareness as a method for accessing a range of mental states that could help with coping with emotional fluctuation derived from design uncertainty while in the midst of it.

Meditation literature further supports this insight. Spencer (2010) speaks of the relationship of meditative practice with the arising of new conditions:

> *Meditation shows us that our desires arise out of conditions and are constantly changing when new conditions come along. Therefore desire is*

> *not a 'thing' we need to either follow or reject – it is just the arising of conditions in the moment. When this realization is experienced clearly and repeatedly it allows equanimity to develop (Spencer, 2010: pp. 563-564).*

He further reports on attributes resulting from meditative activity such as clarity, calm, focus, equanimity, confidence, sympathy and compassion. Moore (2011) maintains that mindfulness meditation training makes you better at focusing by allowing better regulation of how things that arise will impact you. Other reported effects of these disciplines are: spontaneous, non-egocentric action (Rosch, 1997); social connectedness (Hutcherson et al., 2008); compassion, eco-centricity, alteration of the brain structure (Austin, 1999); cognitive change and a reduction to habitual responding (Wenk-Sormaz, 2005).

Founded on the meditation literature it would be reasonable to suggest that these practices are non-analytical and aim: to promote mind experiences of being still, of being present and of non-attachment to concrete models of thought; to utilize deliberate mindful attention in order to increase self-awareness and to promote a state of conscious stillness where such self-awareness is evident, where no thoughts are needed to validate such recognition, and where actions are non-reactive. Furthermore, such disciplines may: reduce uncontrolled streams of thought and reaction to them; advance spontaneous non-egocentric action, empathic capacity, sympathy and compassion; and cultivate clarity, calm, focus, equanimity and confidence, which can be considered highly effective when facing uncertainty.

The pilot study demonstrated that the ability to access and recognize mental stillness is valuable for the development of dynamic self-awareness, and for the management of uncertainty and decision making on the basis of limited information.

4.0 Discussion

It would be useful for design research to assess data for when designers experience greatest turmoil, however there appears to be greater value in nurturing designers to become self-aware and better prepared to face these situations. Spencer (2008) suggests that 'the role of a designer's awareness and their mental and emotional conditions is a potentially fruitful area of investigation in relation to Reflective Practice' (p. 34). This research seeks to further understanding on the ability of designers to cultivate stillness, and on the tools to support this competence.

Thus, this paper proposes the term 'stillness' as a design-intelligence competence. Beyond the proposed attributes, stillness also suggests a

phenomenon that can be further described as space between thoughts, words and actions. Carter (2011) describes ‘basho’, a concept akin to stillness by Japanese philosopher Watsuji Tetsurô, as ‘emptiness of betweenness’. Parallel to the concept of basho, it is suggested that upon deliberate mindful attention, moments of emptiness, of stillness, can be found framing every manifested thought, word or action cycle. In this light, ruminating streams of thought, which link directly to automatic emotional reactions, are embedded with a complementary amount of moments of stillness available to be recognized within a designer’s self-awareness. Stillness operates in that moment between the facts of experience, and a designer’s perception and value judgment of such experience.

While it may be possible to deem the effects of uncertainty as undesirable, the authors contend that an efficient approach to such effects is not resistance, but increased awareness of them. Michalko (2006) says that ‘nothing is more harmful to a positive creative attitude than fears, uncertainties and doubts’ (p. 3). Yet, he explains that you do not ignore them or become paralyzed. Following the incident ‘you do not allow it to monopolize your thoughts’ (ibid). This, in the authors’ view, is the experience of non-attachment. The authors propose that designing is framed by a radical constructivist epistemology and that the value of stillness is that it helps make the construction of knowledge less fixed in the mind of a designer whose dynamic self-awareness is an ever-evolving, open source of infinite possibilities. If a designer’s awareness is less contaminated by unobserved judgments it could potentially lead to more creative outcomes and to higher quality output. Based on this study’s findings, the authors suggest that:

- Improving a designer’s inner self-awareness through enhanced reflective practice can promote dynamic self-awareness to include previously tacit elements of a designer’s inner-environment.
- Improving a designer’s inner self-awareness through enhanced reflective practice can make the evolution of a design-intelligence competence explicit.
- Improving a designer’s inner self-awareness through enhanced reflective practice can aid the access to, and recognition of, mental states of stillness.
- Experiencing stillness can result in self-confidence and skillful management of the effects of design uncertainty.
- Experiencing stillness can lead to less fixated regard of multiple perspectives and wider acknowledgement of the facts of a design situation, thereby expanding the transformation potential of the individual and the field.

To study and validate such phenomenology, reflective practice reporting, through reflective practice templates enhanced with non-analytical meditative disciplines, is proposed as a tool to generate data on this view from within. The methods supporting this research are being adapted from Scharmer (2007), Varela and Shear (1999) and validated meditation and mindfulness research. The authors propose that, just as the typical moments of action research can be expanded and enhanced, that Reflective Practice Models can be further developed to focus and elicit reporting on of self-assessment and self-transformation.

5.0 Conclusion

Reflective Practice has many reported benefits and uses for making tacit aspects of design practice explicit. This paper discusses the way that a reflective approach could be narrowed and enhanced to enlighten aspects of a designer's inner-environment. Designers' inner-conditions are framed by their sensed perception of emotional fluctuation cycles resulting from their experience of the resolution of uncertain situations of practice. It is suggested that aspects of this experience are tacit. Enhanced reflective disciplines, as proposed herein, aim to improve a designers' awareness of their inner-condition thus promoting dynamic professional self-awareness.

This paper finds that the qualities of mental non-attachment and mindful awareness can reduce habitual reaction to ruminating streams of thought, thus promoting confidence when engaging with uncertain situations of design practice. Whilst the issues and relationships of design attention vary relative to situation and purpose, a designer's self-awareness can be considered as a constant datum for the framing of design space, since the designer is always part of that space.

Finally, this paper proposes that, by developing stillness of mind, designers can become omnipresent and witness a perception of experience that is less fixated by concrete models of thought, thus becoming fully open to the potential of design situations and transforming themselves and the world through design.

6.0 Further Research

Further research will investigate if inserting non-analytical meditative tools into the reflective cycles can lead to more effective transformation of a designer's self-awareness. It will also seek to establish if the experience of stillness is a consequence of this transformation. It is anticipated that the recognition and experience of stillness during uncertainty-resolution of

design practice situations, can be validated as a competence of design-intelligence.

Prospective studies will also consider deeper aspects of stillness. Young, Cooper & Blair (2001) say that there is an irony to design and ask:

> *How is it that we can produce so many wonderful looking artifacts yet utterly fail to create real connection, peace, harmony, balance with each other and the world we stand on (p. 2)?*

They further suggest that designers are unconsciously part of a design world in turmoil where they create 'amazing things for the world, seemingly at the cost of the world' (p. 3). If cultivation of stillness can advance spontaneous non-egocentric action, empathic capacity, sympathy and compassion in a designer, then its reach, as a competence of design-intelligence, can expand to meaningful roles in broader social contexts.

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DRS // CUMULUS 2013
2nd International Conference for Design Education Researchers
Oslo, 14–17 May 2013

Enhancing structured reflective practice to complement the “Design Praxium” vision

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Abstract: *This paper suggests that an Enhanced Reflective Practice model, as part of a structured reflective practice discipline, supports the vision of an initiative known as “Design Praxium”. This initiative aims to fulfil: (i) a need for a new type of design practice; (ii) a deeper design educational experience; (iii) a new generation of designers that are able to shape new contexts through design. Design Education would benefit from the inclusion of practical ways to cultivate values that may develop hand in hand with design theory and technique. If mental training disciplines that aim to ultimately foster cooperative human qualities can be inserted within existing structured reflective disciplines in an educational context, then rising design students may progress into professional endeavours with higher potential of making more sustainable and socially responsible choices. This paper presents the theoretical context for a developing study that will investigate if the techniques of Enhanced Reflective Practice stimulate mindfulness and promote cooperative human qualities. It is argued that developing these qualities within a design education environment holds the potential to move 'Design' towards the vision of 'Design Praxium'. Moreover, it is concluded that the significant value of this approach is the seamless integration of the disciplines of mindfulness and that of structured reflective practice.*

Keywords: Enhanced Reflective Practice; Mindfulness; Stillness; Meditation.

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Introduction

Young et al. (2001) coined the term "Design Praxium" as an exhortation to a new way of thinking that may support a new ideology for the future of design education. They suggest that the current focus of design is on tangible, aesthetic elements disregarding wider social implications. In this light, they establish that:

> The designer's engagement with both intangible and tangible levels of designing requires new understanding modes of investigation and new methods of assessment. The virtue of this challenge will be in re-aligning the designer's values, to broaden the remit of design to move beyond our immediate sphere of influence and address our sphere of concern. (Young et al. 2001)

"Design Praxium" advocates a new approach to design education that contends with the current world-view that separates ethics and values from rational and logical thinking. This paper introduces the idea that an Enhanced Reflective Practice (Rojas et al. 2012) discipline can be a significant part and support of this new proposed approach to design education.

Action research through the structured application of reflective practice models is part of current design education and aims to develop reflective design practitioners (English 2009). Blaiklock (2010) proposes a structured critical reflection teaching and learning framework to cope with student's difficulties in understanding and articulating relationships between design practice, processes and research. Ultimately, the goal of such approach is to train students to "build, apply and disseminate new knowledge from their practice" (ibid). This paper suggests that a structured reflective practice model can be enhanced with synchronous mindfulness-based techniques to complement and illuminate the research component, cultivate attentive awareness, and to promote cooperative human qualities. Design literature reflects the need to include the promotion of such qualities. This document reviews literature concerning values and desirable human qualities in Design; the concept of mindfulness; and details the structure and rationale of the Enhanced Reflective Practice model. Moreover, this paper aims to serve as a base for a developing study seeking to validate the impact of this model on the fostering of such qualities to support the "Design Praxium" initiative.

Values and Design

Schön (1987) explains that when "professionals fail to recognize or respond to value conflicts, when they violate their own ethical standards, fall short of self-created expectations for expert performance, or seem blind to public problems they have helped to create, they are increasingly subject to expressions of disapproval and dissatisfaction". Lawson (2006) states that design inevitably involves subjective value judgement and explains that questions about which are the most important problems, and which solutions most successfully resolve those problems, are often value laden. He further suggests that designers may be seen to prescribe and to create the future, and thus their process deserves not just ethical but also moral scrutiny.

Inácio & Gerardo (2006) illustrate clearly the moral dilemma faced by the design practitioner by differentiating between application of a "better action" to support the demands of a design problem, and the "moral action" which could, upon analysis, be obviously beneficial to a larger good. They establish that the designer can only be akratic in almost every action, and define akrasia as incontinence in moral actions. This could be also understood as acting in a way contrary to one's sincerely held moral values. Furthermore, they utilize a "table of torture argument" as an experience of thought. The "better action" is a design that considers "construction with resistant and beautiful materials, with an enhancement of the tormentor usability, inflicting the most possible amount of pain to the victim without letting him pass out" (ibid). The "moral action" in this case is obviously not to commission such project. Of course, our day-to-day moral decisions may not be so extreme and can have wide room for moral opinion and debate. An example that is more accessible is the one where they describe a graphic designer's decision between the uses of sustainable paper as a "moral action" as opposed to non-sustainable paper as a "better action" because it will grant better results. The pragmatism that is inherent to the striving for subsistence of course has an impact on a designers' dilemma of balancing values with actions. Inácio & Gerardo refer to this as dilemmas of two wills, the internal and external dilemmas of the designer.

> In the internal dilemma, the designer could be confronted with two wills, between reason and pathos; both interfere with the internal rational capacity of creating intentions. In pathos we can subdivide it in two categories: first, is what we may call immediate necessity, the basic needs of the quotidian, like the necessity to earn a living, to eat, to have a job, etc; second, what we may call of pathosmania, or selfindulgence, the need of recognition and ambition, to excel in the better action. In the external dilemma there is the will of the designer and the will of another agent exterior to himself. In this case the will of the client. (Inácio & Gerardo 2006)

To avoid a general assumption of what is or is not universally moral, it is important, that within the scope of this document, values are considered very individual and defined only by what the designer holds to be meaningful and dear. Having said that, it could be argued that the promotion of valuable human qualities such as compassion, empathy and eco-centrism, could make for a purposeful aspiration to establish worthwhile common ground in the experience of design practice value choices.

Cooperative Qualities as Contemporary Design Demands

The Design Industry is moving towards bigger participating roles in improved ways to contribute to sustainable global solutions. Young et al. (2001) propose that there is "an irony to design"; they state that:

> The activity of creating the new is stuck in an out of date orthodoxy. How is it that we can produce so many wonderful looking artifacts yet utterly fail to create real connection, peace, harmony, balance with each other and the world we stand on? (Young et al. 2001)

Scharmer (2009) declares that we live in a time of massive institutional failure, collectively creating results that nobody wants. Inácio & Gerardo (2006) point to the fact that design has an impact in the world yet, most of the time, "…it is a negative one, not only in social-cultural aspects, but also in an environmental perspective".

The last few decades have been bursting with calls for change to the way we relate to the world and to each other. Young et al. (2001) suggest that design "can and will act as a catalyst for positive, sustainable change to the economic, political, ecological and social future of our countries and their societies – now and in the future". It would seem reasonable to assert that as designers, it is necessary to rethink our relationships with the Earth and our fellow living beings, and consider the impact of our design choices. It is also important to merge the evolution of design practice and education with the exploration and development of cooperative human attributes. Words like balance, harmony, sustainability and the considerations of others, and of the well-being of the world, continue to expand topics of profound academic research and professionally sound applications. And it would seem as if meaning and fulfilment are found in actions that have at the heart of it, the intention of benefiting others and perhaps in a future that we may not see. Much like the definition of the true meaning of life offered by Henderson (1986) to be: "to plant trees, under whose shade you do not expect to sit". In this light, Young et al. (2001) introduce a new idea of success that is, design that "operates with full awareness of context, honouring a world we would want for our children". They further state:

> We could use the Native American definition of longevity that takes into account not just our succeeding generation but a total of seven generations. This would mean two new challenges for design, greater awareness and holism in meeting real needs, and longevity and sustainability in practice. (Young et al. 2001)

It is obvious that beyond the technical and theoretical aspects of design, there are contemporary demands that call for evolving human qualities to meet with attainment of practical skills. This calls for attributes such as empathy and compassion, which allow taking into one's view the considerations of larger groups of people. Thus perhaps kindling design behaviour that is socially responsible and sustainable. Furthermore, the educational setting offers the opportunity to study and cultivate design behaviour within a fertile environment where new disciplines could potentially be inserted as part of future components within basic design education and practicum settings.

Meditation, Mindfulness, Stillness & Awareness

Extensive empirical evidence supports the notion that meditative and/or mindfulness-based disciplines improve overall human well-being and predict less cognitive and emotional disturbance (Kabat-Zinn 1990; Lynch et al. 2006; Shapiro et al. 2006; Brown & Ryan 2003). A wide range of cooperative human qualities is claimed to derive from such practices including: empathy (Shapiro et al. 1998; Krasner et al. 2009), equanimity (Spencer 2008), spontaneous non-egocentric action (Rosch 1997); social connectedness (Hutcherson et al. 2008); compassion & eco-centricity (Austin 1999). Terms like "meditation", "mindfulness", "stillness" and "awareness" are used interchangeably in literature as both, techniques and also as qualities of being. Such techniques are non-analytical mental exercises that range widely from breath, body and emotion awareness, to various other forms of active and passive meditative activity (Ekblad 2008; Lazar et al. 2005; Kabat-Zin 2002).

Meditation has been referred to as "living in the present moment" and as a family of techniques that attempt to focus attention in a non-analytical way, and not to dwell on ruminating thought (Austin 1999). Wallace (1999) describes it as methods "to train the attention". Spencer (2008) suggests that, through meditation practice, a design

practitioner learns how to develop attentive awareness and to be connected fully with the present moment. He further states that it can promote experiencing the design process with equanimity, calm and clarity.

Mindfulness is referred to as both, a form of meditation and as a result of it. Lazar et al. (2005) call it a mental capacity, which is "a specific non-judgmental awareness of present-moment stimuli without cognitive elaboration". Nhat Hanh (1976) uses the term "mindfulness" to refer to keeping one's consciousness alive to the present reality. It is further suggested that:

> Although attention and awareness are relatively constant features of normal functioning, mindfulness can be considered an enhanced attention to and awareness of current experience or present reality. (Brown & Ryan 2003)

Spencer (2010) describes meditative activity as a "gentle effort to be still", and refers to "stillness" as a letting-go of attachment to the flow of thoughts. He further explains that "acceptance" is central to the experience of gradual stillness. Scharmer (2009) speaks of an "inner place of stillness where knowing comes to the surface". Furthermore he suggests that when a shift in awareness is recognized, it involves an essential quieting of the mind that Buddhists call "cessation," wherein the normal flow of thoughts ceases and the normal boundaries between self and world dissolve. The concept of "stillness" was introduced as competence of design intelligence and described as:

> An ability to access a range of mental states that are characterized by: considerably reduced habitual reaction and non-attachment to uncontrolled streams of thought; and by mindful awareness and acceptance of a designer's inner condition, and of perception of the present circumstances. (Rojas et. al 2012)

These and other similar disciplines and terms are inspired by Wisdom Traditions, and a common thread or purpose can be established. In this sense, it can be stated that these disciplines aim to enhance and cultivate attentive awareness and acceptance of the present moment and of one's current inner-condition. Ultimately, as part of the philosophy of Wisdom Traditions, they seek to foster desirable human qualities such as: loving kindness, compassion, joy, and equanimity (Kraus & Sears 2009). Vyas et al. (2012) allude to these disciplines as "awareness development practices" and relate them to particular qualities of attention such as: being fully present, empathy, compassion and non-judgement. Austin (1999) says that a highly compassionate being enters into what he calls the ultimate human equation: "self equals other", and states that:

> Once compassion issues from this ground level of being, the whole person becomes free to relate, ecologically, to the entire environment. Where is the old egocentricity? It has turned inside out. Eco-centricity prevails (Austin 1999).

In the spirit of clarity, this document will refer to "mindfulness", as both the quality of attentive awareness and acceptance, as well as to the techniques that cultivate such mental state. Furthermore, this paper describes the way to enhance structured reflective practice with mindfulness-based techniques with the aim of cultivating mindfulness as a quality of being; and ultimately to foster cooperative human qualities in a design student, in support the "Design Praxium" vision.

Enhancing Structured Reflective Practice

Stemming from a pilot study, Rojas et al. (2012) introduced the "Enhanced Reflective Practice Reporting Template" (Figure 1), which incorporated non-analytical mental training techniques inspired by Wisdom Traditions. They highlighted the value, within the context of professional practice, of improving a designer's professional inner self-awareness through reflective practice enhanced with techniques aiming to enhance attentive awareness. It was further claimed that improving a designer's inner self-awareness through enhanced reflective practice can: "promote dynamic self-awareness to include previously tacit elements of a designer's inner-environment", and "aid the access to, and recognition of, mental states of stillness" (ibid).

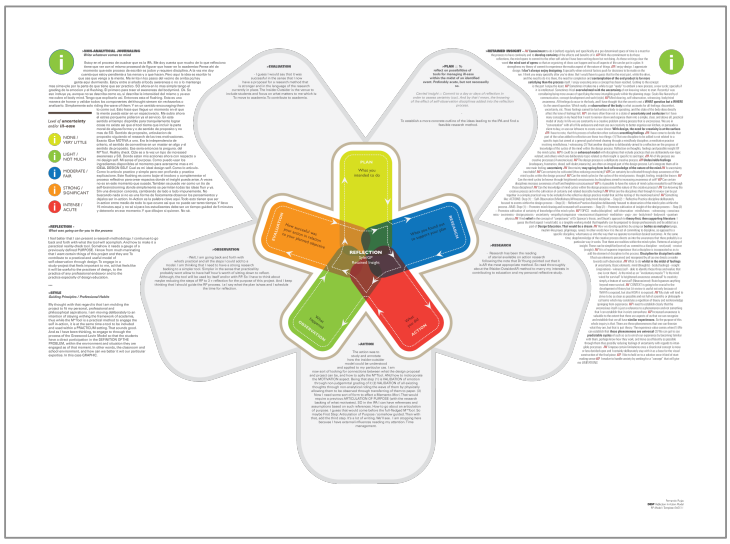

Figure 1. *Example of an "Enhanced Reflective Practice Model Template". The model incorporates mental training techniques inspired by Wisdom Traditions. Source: Rojas et al. 2012.*

The Enhanced Reflective Practice model is a modification of the action research reflective model that is part of a Master of Arts program that encourages design students to develop a structured reflective practice discipline (English 2009). This model, in turn, is an adaptation of the typical action research moments: plan, act, observe and reflect, as described by Zuber-Skerritt (1992). The mindfulness-based enhancements, which aim to help practitioners learn to "concurrently hold, observe and consider multiple points of view with non-attachment to their reactions" (Rojas et al. 2012) are outlined as follows:

> The original reflective moments as presented in the structure of the MA are: plan, research, action, observation, evaluation, and reflection. These are all analytical. The meditative techniques incorporated are: (1) Non-analytical journaling; a cathartic approach to quickly writing whatever comes to mind, and, (2) Self-observation of the perceived level of emotional fluctuation as an effect of uncertainty before and after reflection. (Rojas et al. 2012)

Moreover, they propose that the Enhanced Reflective Practice template was conceived as a base for evolving models that can be further developed to "focus and elicit reporting on of self-assessment and self-transformation" (ibid). Yip (2007) proposes that in the process of self-reflection within reflective practice, the self is turned into an observable object, a process that can "gradually release individual's deep-seated feelings, cognition, memory suppressed in the unconscious". This focus on self, adds the element of critical reflection as part of the analytical aspect of a reflective cycle, to be further synchronized with the non-analytical attentive awareness techniques. This point of view, as it relates to a reflective design practice, was explained as follows:

> This approach is concerned with unconscious habitual reactions that may inhibit exploration and investigation. It is an inclusive acknowledgement of: a) the details of a design situation; b) the designer's value judgments of such facts, and; c) the third element, the witness who observes from a space in-between. Therefore, the environment of design, and a consideration of the multiple perspectives of a design situation, should include a designer's dynamic awareness, assessment and potential transformation of their own inner environments. (Rojas et al. 2012)

Critical reflection calls for questioning of values, beliefs and assumptions (Fisher 2003; Blaiklock 2010), which is a process of "making evaluations about ethics, morals, wider social, political and cultural implications that occur throughout a design project" (Lynch 2005 cited in Blaiklock 2010). While mindfulness is a non-analytical, non-judgemental process, the enhanced awareness and human qualities that it seeks to cultivate can, not only, illuminate those aspects of the self that are being observed, but also effect cognitive change. If a discipline of Enhanced Reflective Practice can improve a designer's inner self-awareness, then it could open a space for a clear view of aspects specific to critical reflection. In this light:

> The ontology of critical social science suggests that human beings, through critical self-reflection, can come to see the true nature of their existence and act to change their situation, based on this understanding. (Fay 1987 cited in Fisher 2003)

Spencer (2010) explored a point of view suggesting that continuous commitment to a rigorous process of reflection is key to be able to benefit fully from the accumulated experience of the reflection cycles, and that non-analytical disciplines complement the reflective process as tools for increased attentive awareness. Blaiklock (2010) highlights "structure" and "cohesion" in the context of design students reaching a "high level of academic literacy, writing, critical reflection and knowledge construction". He further points out that a "structured and applied critical reflection teaching and learning framework, can enhance the effectiveness of design research education" (ibid). The act of disciplined commitment may also somehow nurture our creative natures, so creativity (and any other quality of self or endeavour) may occur proportionally to the level of commitment to the practice. Vyas et al. (2012) say that the cultivation of the capacity "of becoming aware" is the "basis for human creativity and success" (Sice & French 2004 cited in Vyas et al. 2012). And further propose that a "disciplined act of cultivating our capacity "of becoming aware" of the sources of our experience and, thus, opening up new possibilities in our habitual mind stream", is needed as an alternative to reflection (ibid). They further differentiate "becoming aware" from reflection:

> Action in terms of "doing" or "reflection" is an activity of the actor towards or in response to the environment. The act of becoming aware, on the other hand, is one of uniting, connecting within (to self and body) and without, i.e. being part of the environment, experiencing being part of the universe. (Vyas et al. 2012)

Ekman et al. (2005) stated that "in Buddhism, rigorous, sustained training in mindfulness and introspection is conjoined with the cultivation of attentional stability and vividness". Disciplined mindfulness practices are further considered in literature to physically alter brain structure (Lazar et al. 2005). Wenk-Sormaz (2005) suggests that cognitive change is what Eastern practitioners have concentrated on for centuries and that meditation practice leads to a change in cognitive function. Austin (1999) offers the analogy of a "highly salient alternate state etching itself into memory" to imply how, through awareness disciplines, a "brain can become structurally different from before". This is akin to the concept of neuroplasticity. Schwartz & Begley (2003) define neuroplasticity as "the ability of neurons to forge new connections, to blaze new paths to the cortex, even to assume new roles"; in other words "footprints of the experiences we have had". Recent scientific research on the "causal efficacy of will" supports this notion:

> The implications of directed neuroplasticity combined with quantum physics cast new light on the question of human kind's place, and role, in nature. At its core, the new physics combined with the emerging neuroscience suggest that the natural world evolves through interplay between two causal processes. The first includes the physical processes we are all familiar with - electricity streaming, gravity pulling. The second includes the contents of our consciousness, including volition. (Schwartz & Begley 2003)

As a result, a reflective design practitioner with improved inner self-awareness and outer world-awareness may consciously and continuously witness the cognitive evolution of, what could be known as, his or her own "Design-Self" (Figure 2).

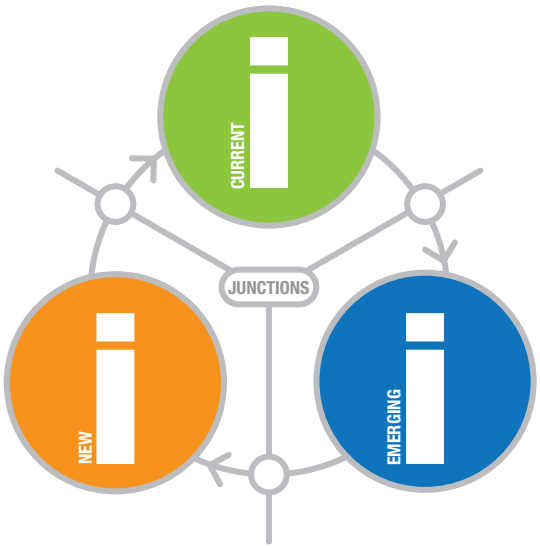

***Figure 2**. In this diagram the letter "i" represents the "Design-Self" in an ever-evolving cycle.*

English (2010) proposes that design happens simultaneously in both the designer and the thing designed. In this sense, a "Design-Self" can be viewed as an ever-evolving entity that is created anew through reflective designing in a process that transforms our self-perception and even our brain structure. As we examine a "Design-Self" that seeks to honour meaning as well as practicality, an attempt at establishing context is helpful. Cognition of a "Design-Self" can be understood, for the purposes of this document, as the result of the degree of intersection between: (i) a designer's set of evolving values and world views; and (ii) a designer's behaviour and actions. Disciplines advancing attentive awareness can potentially help designers reach inner places of aware stillness and prospectively allow them to witness the extent to which such elements meet and define their current "Design-Self".

These inner-places of stillness are junctions where a designer can dwell within a space of awareness that is contained in-between the end of an old, and the beginning of a new, cycles of process and/or of being. This place is, at the same time the end of one cycle, and the beginning of another. It is a gap of alert attention in which mindful-perception occurs. A place of stillness that "operates in that moment between the facts of experience, and a designer's perception and value judgment of such experience" (Rojas et al. 2012). And as such, designers can realize and become familiar with what could be known within the design process as: (i) a Current, (ii) an Emerging, and (iii) a New "Design-Self". The latter, for the next cycle would be an enhanced Current "Design-Self", in an ever-evolving development.

Mindfulness-based Enhancements

As established, the mindfulness-based techniques integrated to enhance a structured reflective practice template consist of: (i) a form of Non-analytical Journaling, and (ii) a form of Self-Observation. These techniques are inspired by the vast array of mindfulness-based means to cultivate attentive awareness and acceptance of the present moment. Yet, their compelling value is in their seamless inclusion within a structured reflective practice model and thus, making the cultivation of mindfulness a part of the reflective process itself, as opposed to a peripheral annex.

Non-analytical Journaling

The process of recording narrative in a structured reflective practice template can be seen as a form of directed or guided journaling. English & Gillen (2001) offer a general definition of it as "writing focused on learning from daily experience", and consider it a form of reflective practice that allows for "puzzling through" and extracting meaning from events and experience. This refers to the analytical component of journaling and/or reflection. In contrast, Non-analytical Journaling is a cathartic stream-of-consciousness. English & Gillen refer to this non-analytical process as a way of suspending all judgement and ultimately fostering creativity. While this is still an act of generating output within the reflective template, its purpose is to empty the current unfiltered mind contents as they become available. Such a goal is comparable to a concept in Buddhism known as "emptying your cup"; a process that aims to unfetter the mind of opinions, ideas and speculations, and increase "non-verbal awareness" (Hyams 1982; Kodish 1998). The directive is of "quickly writing whatever comes to mind" (Rojas et al. 2012) as fast as possible and for a specific number of

words[1]. This technique is used in higher learning schools such as RMIT University in Australia (2012), which includes it as part of a course on creativity concepts. The inspiration for this step is a discipline that Cameron (1999) introduced and described as private meanderings where "nothing is too petty, too silly, too stupid or too weird to be included". It is a meditation that gives us "the light of insight and the power for expansive change", and a way to "separate our login brain that works on known principles, from our artist brain, that is our inventor" (ibid). The purpose of the practice is to cause a "brain-drain" of sorts where excess ruminating thought is "transferred" to the recorded words and thus create a sense of "mind-purging". In the end, the purpose of the practice is to reduce ruminating thought and cultivate the "qualities of mental non-attachment and mindful awareness" (Rojas et al. 2012).

Self-Observation

Self-observation, for the purposes of this document, is understood as an act of taking account of one's own inner-environment in an objective and non-judgemental way. Akin methods are widely researched as tangible scientific concrete processes. Beitman & Soth (2006) describe self-observation as "entailing an active scan of one's inner landscape". Rodríguez & Ryave (2002), propose that the ability to self-observe and report is a skill that can be cultivated, and also a way of gathering methodical data on elements of the self that are "tacit, hidden, and elusive". Their instruction for observation of an aspect of one's inner-environment is "not judge it or question it. JUST observe it" (ibid). It has been suggested that to promote mindfulness "we need to break through established patterns of perception and experience" (Langer 1989 and Udall 1996 cited in Niedderer 2007). Self-observation, within the Enhanced Reflective Practice model, aims to enhance attentive awareness of a reflective practitioner's inner-condition as a way to promote such break in perception and serve as a bridge to mindful-awareness. This is achieved through a colour-coded grading scale where a practitioner can assess, in a non-analytical way, and record their perception of their current inner-condition. Thus encouraging an internally focused perspective, as opposed to a reactive situational point of view.

Conclusion and Further Research

There is a growing need to include meaning in our professional activities and to discover that fulfilment and success have broader definitions. While the claimed benefits of mindfulness are wide-ranging, the significant contribution of the Enhanced Reflective Practice model is that it seamlessly synchronizes mindfulness-based practices with structured reflective practice. This allows for a multiple-perspective approach to the reflective process that integrates analytical narrative and non-analytical witnessing. Furthermore, it promotes attentive inner-awareness of self as well as outer-awareness of circumstance. Reflective practice as action research promotes reflecting on what it is learned and thus learning, not just about action, but also through action (McNiff & Whitehead 2006). Mindfulness promotes the fostering of valuable human qualities that support wider social views compatible with the vision of "Design Praxium" and co-

[1] The original process, as conceived by Cameron (1999) and known as the 'morning pages', consists of three pages handwritten on a notebook. No more, no less. Since reflective practice templates can be approached in different ways, it was estimated that the section pertaining to non-analytical journaling should be of approximately 700 words.

design contexts. Young et al. (2001) see "Design Praxium" as a "catalyst to identify vital insights into the future of design education and to foster meaningful design". They further suggest that:

> Its time to move on! But in moving on we need to become mindful of the way we can unconsciously see the world. Every society ever known rests on some largely tacit, basic set of assumptions about which we are, what kind of universe we live in and what is ultimately important to us. (Young et al. 2001)

This paper's aim is to serve as bases for a study that will investigate if the techniques presented here to enhance structured reflective practice, stimulate mindfulness and promote cooperative human qualities. Beyond the action research component of narrative analysis, several validated methods of measuring mindfulness are being considered. The "Mindful Attention Awareness Scale" (MAAS) is described by Brown & Ryan (2003) as focusing on "the presence or absence of attention to and awareness of what is occurring in the present". This scale seeks to examine the aspect of attention of mindfulness and not the other associated attributes like empathy or acceptance. In a study, the MAAS showed that it "not only predicts well-being outcomes but also has value in the study of the temporal and situational dynamics of self-regulated behaviour and well-being" (ibid). The "Self-Other Four Immeasurables" (SOFI) scale was developed and validated by Kraus & Sears (2009) to measure the component of mindfulness that is associated with cultivation of human qualities. They describe the "four immeasurables" as the qualities that are at the heart of Buddhist teachings, namely: "loving kindness, compassion, joy and acceptance toward both self and others" (ibid). By assessing these "aspirational qualities" the value of their contribution is described further:

> Whereas previous measures appear to focus on the fact that we pay attention, our focuses primarily on how we pay attention. By attempting to measure these previously "immeasurable" qualities, we facilitate study of both wings of mindfulness, attention and compassion. (Kraus & Sears 2009)

It is expected that enhancing structured reflective practice with mindfulness-based disciplines, becomes a validated method to cultivate mindful-awareness and cooperative human qualities in design students. In co-design contexts this will assist by promoting the development of "an adequate co-creative capability to allow for socially responsible action" (Vyas et al. 2012); and will also complement the "Design Praxium" vision of a new breed of creative professional that can "rise to the challenges of designing better schools, better democracies and better ways of living" (Young et al. 2001).

Acknowledgements: *The author would like to thank Dr. Nicholas Spencer, Dr. Stuart English and Dr. Robert Young of Northumbria University in Newcastle, UK, for their guidance and mentorship.*

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DRS//CUMULUS//Design-ed 2015 Chicago, Illinois, USA

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Making Mindfulness explicit in Design Education

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Abstract: *As new approaches to Design Thinking emerge, mindfulness and other related abilities are discussed as skills that should be made explicit in Design Education. Research on the topic of mindfulness spans about four decades in various fields of study and several streams of research approaches have expanded the ways it is described. Diverse human qualities that are associated with these practices are also deemed important for designers. Whilst this is so, Design literature does not appear to explore detailed ways to integrate it into design-learning environments. This propositional paper seeks to establish the conceptual approach behind the argument that a Systemic-Mindfulness-Device (SMD) can make the role of mindfulness explicit in Design Education and enhance a designer's inner awareness. Inner awareness is considered fundamental to also enhance awareness of our relations with others and with the world, which is important for emerging participatory and co-design contexts. That being said, it is also reasonable to assert that all Design choices have a relational aspect to it, whether explicitly as co-design or in more traditional contexts. A SMD is understood as a reflective tool embodying and merging mindfulness, mapping, and systems thinking in order to blend mindfulness into designerly processes of learning.*

Keywords*: mindfulness; systems thinking; visual mapping*

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Introduction

Thinking about Design ranges from considering 'small' problems such as aesthetics, image and fashion, to Design Thinking as an approach to designing participatory systems that tackle 'big' issues with design briefs that aim to manage subjects like global warming (Brown, 2009). Juul-Sørensen (2014) calls this designing for the 99% of people for whom a luxury product is clean water as opposed to an expensive handbag. This 'big' issue Design Thinking is increasingly the approach to Socially Responsible Design (Young, 2012). In these approaches, designers come together with stakeholders to achieve innovative system models that rely on new skills, including mindfulness (Howard & Melles, 2011). Owen (2007) considers these new skills to be tacit in Design Education and suggests the need for them to be taught explicitly as Design competencies. Young (2012) concurs with this view that the role of mindfulness can be made more explicit. Rojas (2013) suggests that Design Education may profit from the inclusion of mindfulness to cultivate cooperative human qualities. He proposes that:

> If mental training disciplines that aim to ultimately foster cooperative human qualities can be inserted within existing structured reflective disciplines in an educational context, then rising design students may progress into professional endeavours with higher potential of making more sustainable and socially responsible choices (ibid, p. 1).

Mindfulness and related concepts are found in Design literature in several relevant contexts. Young (2012) suggests that such practices may promote trust and empathy and help address ethical behaviour considerations that support social responsibility. Niedderer (2013) describes mindfulness as a mindset that considers different perspectives and as key for designing for behaviour change. Vyas & Young (2011) claim that it promotes more co-owned Design output that addresses real human needs. And Vyas (2014) has investigated if mindfulness can also promote virtues associated with eco-centricity in co-design teams. Others have contrasting views on these social and ethical considerations. Stairs (2009), for example, considers the outpour of interest in socially relevant design as trendy, and suggests that there must be an increase of design sales because of the fetishizing of social relevance. Akama (2012) highlights the central role of Design in influencing ideas and behaviours, thus making what's 'right', 'desirable' or 'admirable' an important Design concern. At the same time she critiques discourses that attempt to embed ethics within Design and views them as a way of abstracting values and imposing ideology. She emphasizes the importance of forging aware relational connections that bring forth openness, empathy and mindfulness and offers a view on the prospective impact of awareness of self, others and the world:

> True, long-term sustainable change towards building and creating an ethical practice cannot come from being told what to design or choosing the 'right' values to adopt. Neither does it come from simply undertaking community-based projects, taking up a social cause or deploying participatory methods. […] It requires active creation and the practising of practice that is truly human0 centred and aware – aware of oneself, of others

> and the world we live in. It is a day-to-day application and manifestation, not merely a mechanical repetition. The significance of this being a practice is that it is a transformation and evolution of ourselves in bringing an awareness and embedded-ness to what we do everyday (ibid: p. 1).

She makes a vital point that ideological arguments place overstated ethical judgment calls on designers when agendas, people and politics also determine Design outcomes. Instead of 'rationalistic ethical design discourse of axiomatic moralistic injunctions', she proposes self-awareness and transformation through interconnectedness, self-awareness and reflection (ibid, p. 7). Akama & Light (2015) see mindfulness, not as a goal, but as a pathway for self-realization and a discovery of new ways of relating to others. If we adhere to this view that steers away from abstracting values or imposing ideology, and that considers potential transformation through a kind of reflective self-awareness, then the merits of such view should be explored in order to support the reasoning behind a SMD. In order to construct this argument, this paper first explores descriptions of mindfulness and related terms in Design literature and in other fields. This analysis, complemented by notions of mapping and systems thinking relevant to Design, will then yield a rationale for the construct of a SMD. And finally, a preliminary view of the implementation of an early version of a SMD to a design-learning task will be described.

Overview of mindfulness and related concepts

This section examines ways in which mindfulness and other related concepts (such as meditation, presence, awareness, attention, consciousness, stillness, reflection, focus and relationality) are described in Design and in other fields; explores how these are relevant to Design concerns; and synthesizes a material definition of mindfulness that will help frame the rationale of a SMD.

Spencer (2008) considered the benefits a designer may gain from meditative practices including conceptions of stillness and mindfulness. In his work, stillness is described as a shift in perspective that fundamentally changes, to a non-attached way, the manner in which we relate to arising experience and to the objects of our perception; and mindfulness is understood as a non-judgmental way to notice the nature of experience and to engage the practitioner fully in the present moment. He extracted a number of benefits relevant to designers that are associated with such disciplines. Some of these are: presence, focus, empathic recognition leading to skilful interactions and effective interpersonal relationships, sustained attentive awareness, and reduced hazy states of mind. He concludes that such mental states help draw attention to tacit desires, attachments or aversions, and assist in letting go of attachments thus balancing the way designers respond to a Design situation. Rojas, Spencer & English (2012) sought to improve understanding about the dynamic development of designers' professional self-awareness. They introduced the concept of stillness, framed as a competence of Design Intelligence that is displayed during uncertain situations of Design practice. Stillness in this case is defined as mindful awareness and reduced habitual reaction, and their claim is that by experiencing this state of mind, a designer's perception is less fixated, thus becoming open to the full potential of Design situations and transforming themselves and the world through Design.

Akama & Light (2015) frame a description of mindfulness against the notion of mindlessness when designing. This view highlights a reflective and collective awareness of our relational existence in broad ecologies. They use the term 'reflection' contrasting it to critical reflection, in that mindful open-ended reflection is reflection undertaken as mindfulness, where reflection itself is experienced and not used to reflect *on* experience. Furthermore, they suggest that mindlessness in living and in designing may lead to poorly considered ecological outcomes. In their view, designing makes an unaware contribution to a disconnected view of how our lives are implicated with other constituents of the world, thus causing systemic impact and unsustainable futures. From their perspective, designing mindfully may raise awareness of unsustainable impacts and possibly promote a less materialist culture. Young et al. (2001) relate similar views to the context of Design Education. They suggest that the current focus of Design disregards wider social implications and that we need to be mindful of our unconscious world-views and our tacit assumptions. Furthermore, they suggest a new approach to Design Education that embraces the challenge of realigning designers' values so that Design can act as a catalyst for positive, sustainable change that honours a world we would want for future generations.

This call for action to create systems that address issues of social responsibility and sustainability is multidisciplinary and other fields share complementary points of view with Design Thinking in this sense. Goleman (2013), for example, proposes that a slow-motion systems crash is approaching because of how human systems affect global systems that support life. He further suggests reinventing business for the long future by finding shared values that support all stakeholders. Scharmer & Kaufer (2013) speak of a shift from ego-system to eco-system awareness that involves walking in the shoes of other stakeholders by developing the capacity to suspend old habits of thought, to see the world with fresh eyes, and to empathize by seeing situations through the eyes of someone else. Capra & Luisi (2014) define a sustainable society as one that 'must be designed in such a way that its ways of life, businesses, economy, physical structures, and technologies do not interfere with nature's inherent ability to sustain life' (p. xi). In their point of view, societies need to understand that the material world is a network of inseparable patterns of relationships and that the planet as a whole is a living, self-regulating system.

Young (2012) proposes that *metic* tendencies, which are relevant to mindlessness, are part of Design's current dysfunctions. These attributes in designers may lead to ambiguity, subterfuge, loss of empathy and distrust in the design process. *Metic* intelligence is described by Raphals (1992) as an attitude of mind or mode of action acquired through long practice of repetition of similar tasks, and frequently displayed without conscious deliberation. It is a 'knack' or ability to respond spontaneously to changing circumstances that is often associated with trickery, cunning, obliqueness and deception. Alternatively, it can also be viewed as a resourceful intelligence, fused with moral qualities and harnessed in the service of a legitimate cause. This fluid ability is akin to the tacit skills acquired overtime through design learning and practice in the continuous engagement with design's ambiguity and uncertainty. Young (ibid) likens it to the concept of 'artistry', defined by Schon (1991), as a competence displayed by designers in unique, uncertain and conflicted situations of practice.

The way *Metic* tendencies show pertinence to mindlessness is in that their expression may display, to a certain degree, a lack of conscious deliberation. A point of view from the field of Psychology by Langer (2014) on mindlessness supports this notion. She says that we tend to mindlessly cling to rules and categories through repetition and practice. Mindfulness literature

in other fields suggests that we are all, at any given moment, either mindful or mindless; and that mindfulness is awareness devoid of judgment or of single-minded labelling, cultivated by paying attention in a particular way (Kabat-Zinn 2005; Langer 2004). According to Djikic (2014) the purpose of mindfulness is to address mindlessness, which is associated with: (1) a lack of choice that stems from being dominated by old categories, and (2) a serious and dangerous mismatch between well-entrenched cognitive categories and the emerging (and rapidly changing) world. In other words, a kind of 'autopilot' approach with rigid biases and predetermined rules that may resist the ever uncertain and changing nature of reality (Yeganeh & Kolb, 2009). This is akin to the ambiguous and uncertain nature of designing.

A vast body of literature exists in a variety of fields on the topic of mindfulness. This practice originates from Eastern traditions and is interpreted and applied to Western research mostly with a focus on it's potential benefits on physical and mental health, as well as on the suggested emergence of human qualities like: empathy (Shapiro et al. 1998; Krasner et al. 2009), spontaneous non-egocentric action (Rosch 1997), social connectedness (Hutcherson et al. 2008), compassion and eco-centricity (Austin 1999). The term 'mindfulness' is used both to describe a process as well as it's result. Mindfulness (as a mind state) is cultivated by practicing mindfulness (as a method). In the Buddhist tradition Nhat Hanh (1976) explains it like this:

> Mindfulness is at the same time a means and an end, the seed and the fruit. When we practice mindfulness in order to build up concentration, mindfulness is a seed. But mindfulness itself is the life of awareness: the presence of mindfulness means the presence of life, and therefore mindfulness is also the fruit (ibid, p. 14).

Terms such as: meditation, awareness, attention, concentration, observation, consciousness and focus, are used interchangeably to contextualize and refer to what this attitude of mind is, or can be. And, while the term 'mindfulness' may not used explicitly or as the main term in all contexts, literature in topics of leadership and social innovation refer to relevant terms such as 'awareness'. In this sense Scharmer and Kaufer (2013) state:

> The quality of results produced by any system depends on the quality of awareness from which people in the system operate. The formula for a successful change process is not 'form follows function', but 'form follows consciousness'. The structure of awareness and attention determines the pathway along which a situation unfolds (ibid, p. 317).

Goleman (2013) makes a similar point:

> Systems awareness helps us grasp the workings of an organization, an economy, or the global processes that support life on this planet (ibid, p. 4).

Mindfulness as a method is a form of training attention, and well-developed attention skills have been linked to high-levels of performance and excellence (Wallace 1999; Goleman 2013). Through mindfulness practice, the areas of the brain that control attention become structurally improved and activated (Lazar et al, 2005; Austin, 1999). Moreover, studies in the field of Physics suggest that the act of paying attention not only has a direct effect on what is observed, but it is part of the nature of its reality. Particles at the quantum level exist only as potential, or 'tendencies to exist' until observed, and their properties can only be understood

in terms of their interaction with the observer (Capra, 1982). A series of studies known as the Princeton Engineering Anomalies Research (PEAR) have suggested that 'reality is created by each of us only by our attention' (McTaggart 2001).

Literature recognizes two predominant streams of mindfulness research and practice: meditative mindfulness and socio-cognitive mindfulness (Yeganeh & Kolb, 2009; Djikic, 2014). Meditative mindfulness is associated to work like that of Kabat-Zinn (1990), which is influenced by traditional Buddhist meditation and where the breathing cycle or body sensations are used as objects of attention deliberately observed throughout sustained discipline overtime. Recognizing the 'Observing-Self' (Deikman, 1982) is another known approach that claims that to the extent that we are able to observe the contents of our consciousness, we are no longer completely embedded in or fused with such content (Shapiro et. al, 2006). Suggested human qualities of mindfulness such as social-connectedness and eco-centricity as mentioned, are generally associated with research in meditative mindfulness.

Langer (2000) defines socio-cognitive mindfulness as a process of 'drawing novel distinctions', with emphasis on situational awareness and context. She clarifies that whilst the qualities of mindfulness as emerging from this work are 'strikingly' similar to Eastern concepts, this definition of mindfulness does not consider the moral idea that a mindful state leads to spontaneous right action (Langer, 2014). She does, however, conduct research that suggests a non-dualist view of the mind and the body (Langer, 2009), which is relevant in Eastern philosophical contexts. In this approach the mindfulness techniques revolve around actively noticing 'new things' or differences about a familiar object, person, situation; engaging in new ways with habitual or skilful action; and embracing uncertainty through relabeling absolute or unconditional truths as probability statements. Yeganeh & Kolb (2009) describe other supplemental practices of socio-cognitive mindfulness such as: placing value on doubt, looking for disconfirming data and producing new ways of thinking and acting. A way to contrast these two approaches to mindfulness is that, meditative mindfulness suggests effects that arise overtime and post-practice, and socio-cognitive mindfulness claims an immediate heightened state of involvement and wakefulness or being in the present (Langer, 2000).

Nonetheless, traditional Eastern approaches do promote a kind of 'attention-in-action' that is pertinent to the situational context of socio-cognitive mindfulness. Time-honoured meditative practice is often associated with sitting in place for a period of time while engaging with objects of attention. It is a kind of introspective journey of cognitive perception. This is attention training that results in post-practice effects that 'slowly permeate your life' (Spencer, 2008: p.315). Yet, these traditions have many examples of situational 'attention-in-action' mental training as well. Zen Buddhism practices such as walking meditation, archery, calligraphy and tea ceremonies seek to perfect performance through present-moment engaged action. Still, the teachings extend further to common daily experience. Nhat Hanh (1976) teaches that:

> There are two ways to wash the dishes. The first is to wash the dishes in order to have clean dishes and the second is to wash the dishes in order to wash the dishes (ibid: p. 4).

These teachings aim to train a person to actively attend to the details of their immediate experience of action engagement as they emerge. This attention training attempts to remove the need to prioritize and/or focus on outcome, and assigns value to enhanced awareness of the process as it unfolds. The socio-cognitive approach for mindful engagement leads to the

same result through an alternate view of the process. In this approach, the effort to elicit being in the present throughout the action, is not by deliberately focusing on the process details as they emerge, but through seeking novel distinctions in, and of, a process that is usually familiar and habitual; or where 'rules and routines are more likely to govern or over-determine our behaviour' (Langer, 2000). Whether novelty is eventually recognized is irrelevant because the process of seeking novelty is what promotes mindful awareness.

Returning to Design concerns, a Design approach known as Mindful Design has as its base the theories of socio-cognitive mindfulness. The concept of Mindful Design has been introduced by Niedderer (2013) to 'describe how design objects can be designed to facilitate mindful attention of the physical and social actions within which they are used and of the consequences of these actions' (p.4567). This view frames Mindful Design in relation to existing approaches of design for behaviour change and expands the understanding of socio-cognitive mindfulness through modifying expected functions of objects. In this case, awareness is created by the 'physical or symbolic disruption' of a designed object's function. She explains that:

> Mindful Design facilitates a process of conscious decision making by creating awareness of one's own behaviour and shifting the focus from an external to an internal locus of control through mindful reflection (ibid: p. 4567).

The way this mindfulness approach adapts it's socio-cognitive mindfulness base, is that the unexpected new or omitted feature of the designed object is the cause for the situational change in attention. This mechanism differs from encouraging a voluntary and deliberate engagement with an object of attention, to a disruption in habitual perception through omission of an expected function, or addition of an unexpected one. Whilst this is an explicit understanding of mindfulness, its focus is to have an effect in users of a design as opposed to designers.

Akama (2014) brings to design discourse the Japanese concept of 'Ma', which is parallel to the concept of mindfulness. She describes it as a way to awaken our senses to the 'in-betweens of design', which 'often fall out of conscious attention'. Her claim is that this is central to designing with others. Generally Ma is understood as gaps, pauses, and spaces between; but also as a definition of 'self' as a function of relations with others as opposed to an isolated entity. This between-ness refers to how relationality is experienced or perceived, and more importantly, she claims, it helps to build awareness of the multiple dimensions in which designing takes place. She describes the process as an attuning to the relational dynamics to turn attention and awareness towards the concerns and movement of the collective, situating the designer in 'inter-relatedness – designing, transforming and becoming' (ibid, p. 4).

This awareness of relationality is relevant to a very useful model of awareness from a field called Interpersonal Neurobiology. This field explains the science behind the notion that the internal attunement and self-regulation of mindfulness actually fosters interpersonal benefits (Parker, Nelson, Epel & Siegel, 2015). This implies, that whilst all the suggested effects of mindfulness have relational relevance, it is through transformation of individual inner awareness that this is accomplished. Malik (2009) supports this view and asserts that all global change has as its basis the shift of consciousness of the individual. So far, this paper has reviewed many different ways in which mindfulness is described, understood and applied. The

concept of 'integration' (Siegel, 2010), from the field of Interpersonal Biology captures a scientifically sound synthesis of mindfulness that fits well with the material description sought in this discussion. This will be explored in the next section against notions of systems thinking and mapping to create a rationale for the SMD.

This section will conclude with a basic description of mindfulness as understood by this paper. From the reviewed literature, it is reasonable to suggest that the basic components of mindfulness are attention and awareness. Mindfulness, as a method, is a way to pay attention that is deliberate, usually to a chosen object of attention, and with the intention of it being non-judgmental, or objective. It is possible to practice mindful awareness of any aspect of any process, as well as to just attempt to reach an open state of awareness of anything that emerges into the field of attention. This is also known as presence (Parker et al., 2015). For this discussion, mindfulness is understood as a deliberate way to sustain attention of inner aspects, in other words inner awareness. Such inner awareness can be of aspects of the body such as sensations or awareness of processes (like breathing), as well as an objective exploration of processes of the mind, or of perception. The initial proposition of the Systemic-Mindfulness-Device, as it will be explained, considered personal and professional Design values as the explored objects of attention, and as integrated systemic elements. The next section will consider this basic view of mindfulness and complement it with notions of systems thinking, mapping and integration to consolidate a rationale of the SMD as proposed.

Integration, systems thinking, mapping and values

Siegel (2010), as one of the leading voices of Interpersonal Neurobiology, has proposed a model of what he calls consciousness integration. Integration in his work is a multidisciplinary theory relevant to systems thinking and complexity theories. This field asserts that: (1) a system is composed of individual parts that interact with each other; (2) this system is optimized when it is integrated; (3) integration means that individual components are differentiated (their uniqueness is honoured), and then linked; (4) optimization of the system leads to self-organization and the emergence of properties which are more than the sum of its parts. Siegel's model of consciousness integration takes the form of a visual metaphor called the 'Wheel of Awareness' that views the mind as an emergent property of the activity of neural linkages and relationships (or relationality as discussed in this paper).

This model integrates consciousness through an attention and awareness process (akin to mindfulness) that seeks to integrate aspects of an individual's perception through differentiation and linkage of such aspects. These elements radiate out of a 'hub' of awareness that allows the exploration of the objects of awareness against awareness itself. Siegel describes this inner awareness process as a reflective practice of focusing internal attention on the mind with openness, observation and objectivity. He claims that it is relevant to relational dynamics in that mindfulness promotes neural integration out of which emerge prefrontal brain functions such as intuition, attuned communication, and empathy among others. The Systemic-Mindfulness-Device is founded on this theory of integration viewing the inner aspects of a designer as a system and adapting it to aspects relevant to Design.

The SMD is a visual model, which is uniquely relevant to the language of design. Owen (2007) asserts that all designers work visually and bring common view to concepts otherwise imagined uniquely by members of a group. Vaughan & Akama (2009) advocate visualization as

a way to frame and communicate knowledge discovery within the language and actions of design. English (2009) has reported on the value of integrated visual maps for exploring complexity through multiple perspective problem framing. He contends that such visualizations influence designer awareness and may represent the cognitive structure of a designer. Furthermore, he claims that the process facilitates reflective self-exploration, considers the design space from different points of view and reveals potential for agreement by integrating conflicting points of view in design situations that incorporate different stakeholders (ibid). Also, visual maps are described in Design in ways relevant the relational linking of differentiated aspects of systems. Sevaldson (2001) says designers use visual thinking to create generative diagrams that establish relations between described entities; and English (2008) describes relational ways of seeing to map design space in order to see ambiguous concepts concurrently from different perspectives. Stevaldson (2013) proposes the approach of Systems Oriented Design using rich visual maps to actively inquire systemic interrelations. Systems thinking literature refers to such relations as interactions from which an ecological awareness of systemic qualities emerge (Stowell & Welch, 2012). They suggest that 'a system's existence is essentially a description of systemic qualities perceived by an observer - whether this person is a creator or user of that system' (ibid: p.13). If a system's existence is fundamentally a description of such interrelations, then a rigorous understanding of a system must include awareness of its multiple aspects and their relationality. Visual mapping seems to be efficient in aiding to capture, consider and establish interrelations of aspects of a system and promote exploration that is generative, reflective and relational.

In synthesis, the SMD is a visual tool of integration of a designer's professional inner awareness. If inserted in designerly ways of learning, it makes mindfulness explicit in Design Education. The last elements to describe in this rationale of the SMD are the aspects of the system as relevant to Design. Siegel's Wheel of Awareness is composed of an awareness hub in the centre, and of aspects of individual perception at the rim. The SMD is proposed as a visual map where the 'hub' is represented by a designer's observing-self from where important aspects of inner awareness of a designer radiate. And these aspects of inner awareness to be integrated are designer's personal and professional values (understood as a designer's judgment of what's important and standards of behaviour).

Values are important in Design and other fields. Goleman (2013) says that inner focus attunes us to our guiding values. Langer (2014) asserts that values create a context that influences sense perceptions. Schon (1987) points to the dissatisfaction of failing to recognize and respond to one's own value conflicts. Young et al. (2001) speak of the challenge of realigning designers' values for the benefit of future generations. Lawson (1997) states that design inevitably involves subjective value judgement and explains that questions about which are the most important problems, and which solutions most successfully resolve those problems, are value laden. He further describes 'guiding principles' as operating ideas, beliefs and values that develop over a Design career. Akama (2008) found that values emerge and are inscribed in designers' practices, yet also that to be able to become reflective of the values of others it is necessary to be self-aware of one's own.

In this light, the SMD views a designer's inner awareness of values as a system. The individual aspects constituting this system are the designer's values, everything that is now important including in the role as designer. These aspects radiate out of a centre 'hub' which is represented by an observing-self, or an observing-design-self; which is understood as the entity that differentiates (honours the uniqueness), and then links (highlights the relationality)

of the distinct components. Recognition of the observing-design-self may aid to discern the state of being aware from that which we are aware of (Siegel, 2010).

Conclusion

In conclusion, a Systemic-Mindfulness-Device is a visual tool that merges mindfulness with designerly ways of learning to make mindfulness explicit in Design Education. The SMD rationale accomplishes this by viewing a designer's inner perception as a system to be integrated, where personal and professional values are the aspects of such system radiating from an awareness 'hub' pertaining to the designer's observing-self. If designers are part of the Design problem (Spencer, 2008), then a designer's values must influence directly all aspects of the designing process. To view a designer's value system as the systemic aspects of a designer's inner awareness in a process of integration can lead to important results. Firstly, Lawson (1997) asserts that guiding principles not only are at the root of the satisfaction designers take form their work, but he argues that it is the existence of these ideas that allows us to see Design as a form of research. Furthermore, he believes they are the source of 'primary generators' in a Design project. If designers are designed by designing (English, 2009; Vaughan & Akama, 2009b), and if they transform themselves and the world through Design (Rojas et al., 2012), a direct way of making that process explicit and seeing the evolution of our own Design-Self (Rojas, 2013) is by a disciplined process of reflective engagement with a SMD.

In preliminary observations of engagement with an early version of a SMD, first-year graphic design students where given the visual tool as a Design Thinking academic exercise of the investigation phase of a Design process. The instructions where to map what's important now, including in the role as designer as one of the primary nodes; and radiating from a centre observing-self node. That information was treated then as an investigation into the designer as a design project in itself, where values emerge out of deep self-observation, and inform a Design outcome. A personal symbol and the map itself are ultimately Design artefacts. This process follows the SMD model as described and combines teaching of a tool of Design problem framing in the style of Integrated Mind Maps (English, 2009). During the process of investigation students were instructed to generate multiple sketches as they explored their values with mapping. The final map needed to clearly show the observing-design-self from where value topics radiated; a clear hierarchy of perceived importance of topics where the designer role is among the primary ones; and relational connections of nodes across topics. In this exercise, it is clear that an academic Design activity is seamlessly blended with mindfulness process that promotes deep self-observation, awareness of the process of awareness, and systemic integration of inner aspects of a designer. Figure 1 shows an exemplar where a design student explores, demonstrates hierarchy, and highlights relationality of personal and professional Design values.

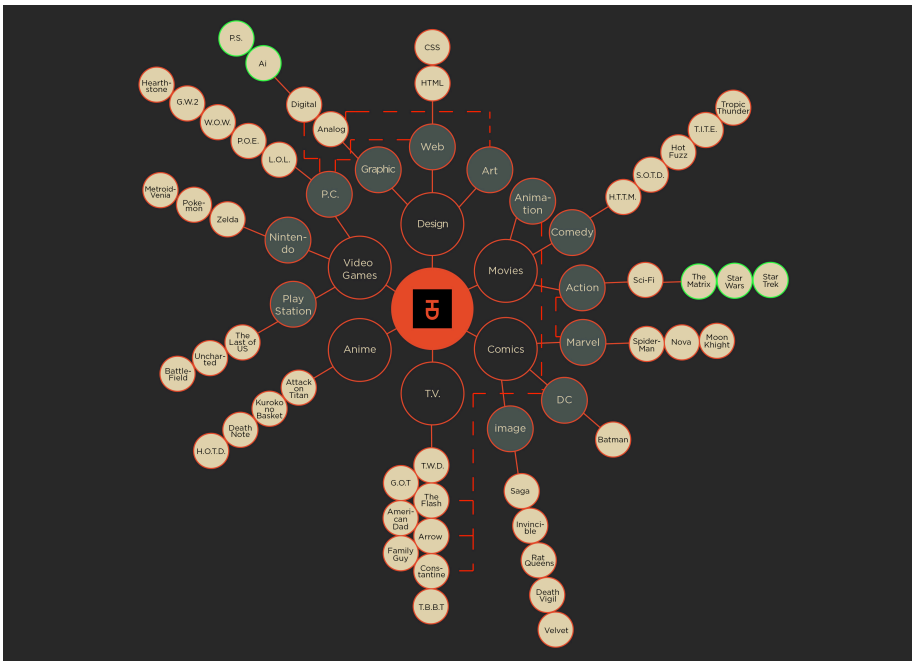

Figure 1 Zayas (2015) SMD exemplar. A common reflection by students upon experiencing the model was that 'things' were extracted about themselves that they did not know were there.

Future research will seek to understand if a designer's inner awareness is transformed by reflective engagement with a SMD. If designers are designed by their designing, then this should reflect in a transformation of Design values overtime. If this transformation is made explicit, then this contributes to the notion of Design as a form of research as well as making the process and effects of mindfulness also explicit in Design Education.

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5º ENCONTRO DE DOUTORAMENTOS EM DESIGN
5TH PHD IN DESIGN RESEARCH MEETING
UNIVERSITY OF AVEIRO
PORTUGAL
22.23 JULY 2016
SOBREVIVÊNCIA

Bridging Mindfulness and Design

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Abstract

Design literature regards mindfulness as a new competency that should be taught explicitly in design educational settings. This is associated to points of view that consider such skills relevant to ethics, uncertainty, and to evolving multidisciplinary, multi-stakeholder co-creative applications of design thinking. This document is part of a developing PhD programme that aims to describe and apply it explicitly to pertinent design academic situations. Extensive literature in diverse fields of research describes mindfulness in a number of ways that are said to sometimes cause misunderstanding. This conceptual paper aims to bridge mindfulness and design, and posits the concept of openness as a shared attribute within theories complementary to both. Openness, understood as receptivity to dynamic multiple perspectives, is then associated to the systems experience of interconnectedness as an alternate focus to the discussion of moral awareness in design. Furthermore, interpersonal attributes of mindfulness, relevant to the relational aspects of design, will be discussed. This analysis seeks to serve as a conceptual base to a doctoral study that explores reflective ways to make mindfulness explicit in design education.

Keywords *mindfulness, design education, openness, interconnectedness.*

1. Introduction

According to design literature, the skills and roles required of the designer are diversifying in order to be able to efficiently act in wicked problem spaces for which there is limited precedence. Mindfulness is one such skill, and its considered to be a tacitly taught competency in design education that should be made explicit (Howard & Melles, 2011; Owen, 2007; Norman, 2010; Young, 2012).

In the sections that follow, the relevance to design of the concepts of mindfulness, mindlessness, openness and interconnectedness will be proposed. Openness is positioned as a shared attribute of mindfulness and design, and is understood as receptivity to dynamic multiple perspectives. Moreover, the visibility of interconnectedness in systems is presented as an alternate point of view to the discussion of moral awareness in line with what Akama (2012) regards as the potential abstraction of values in discourses that attempt to embed ethics with design.

The overall perspective for this blending of mindfulness and design is informed by several inferences. If the qualities that make up a mindful-attitude are also characteristics of creativity (Langer, 2014), then it could be said that designers, by the nature of their training and practice, would tend to develop mindful-awareness disposition. Whilst such mental capacities are associated with moral awareness and are said to foster interpersonal benefits (Siegel, 2009; 2012), design activity does not appear to have consistent ethical behaviour (Inácio & Gerardo, 2006); and the clash of egos is considered a core dysfunction of co-creation (Vyas & Young, 2011). In this sense, Young (2012) highlights the gap between action and intention, and the need to link purpose and practice for co-designers. He further suggests immersion in “evolving heuristics” to address this in design learning activities.

These points of view will be discussed by developing a multidisciplinary argument around openness and interconnectedness that seeks to bridge descriptions relevant to mindfulness and to design.

2. Mindfulness and mindlessness synthesized

Whilst evidence of ambiguity and confusion is found in research literature that aims to converge research-oriented descriptions of mindfulness (Hart, Ivtzan & Hart, 2013), this paper does not aim to resolve them. Instead, a synthesized view is offered to help construct an understanding of the term that is applicable to design interests. In contrast with mindfulness, mindlessness is described as automatic action that can be useful since it unfetters the mind to execute higher levels of cognitive functioning (Langer, 1992; 2014). The argument against mindlessness is that most mental information processing seems to be mindless, and studies reveal that running on "auto-pilot" for too long can be detrimental to those same cognitive functions (Kahneman, 2011; Langer, 1992, 1997, 2014; Langer & Piper, 1987).

The concept of mindfulness stems from Wisdom Traditions and its described as the underlying mechanism of meditation (Feuerstein, 2003). Thich Nhat Hạnh, a well-known Buddhist monk whose teachings are framed around mindfulness, refers to it as keeping "consciousness alive" to the present reality. Whilst "sitting" meditation is still a pillar of the traditions, mindfulness is described as a meditative mental state that can permeate all aspects of daily life. He explains:

> "The chances (for mindfulness) are scattered everywhere: in the bathtub, in the kitchen sink, on a cutting board … literally anywhere. The moments and places of silence and stillness are wondrous and helpful, but not indispensable". (Nhat Hanh, 1975, p.107)

Meditative frames of mind appear to pivot around the quality of attentive engagement with internal or external perceived stimuli. For example, novelty is discovered in previously unobserved aspects of a situation, as in a "non-toothache" (Nhat Hanh, 1991, p.34). Langer (2005, p.214) describes mindfulness as "actively drawing novel distinctions" or "openness to novelty" leading to more informed perceptions. In this light, a potential way that mindfulness could be integrated in context is through discovering as novel, previously unobserved aspects of (in this case) design processes.

The next section analyses how degrees of mindfulness and mindlessness may already be tacitly present in designing.

3. Mindfulness and mindlessness in designing

Designing, as reflective conversation could be considered to inherently integrate both mindless and mindful mental states. Schön (1983) describes an automatic knowing-in-practice as tacit design knowledge that is revealed in the process of designing. This intuitive knowing emerges in the midst of action and designers use this capacity to cope with uncertain situations of practice (ibid). Young (2012) suggests that the way such capacity is developed in designers (via repetition of craft practices) can lead to a *metic* tendency (or *metis*) in designers that, due to the lack of transparency in intent and purpose, can potentially compromise ethical approaches and risk egocentric propensities in multidisciplinary design contexts. Similar to knowing-in-practice, *metic* intelligence refers to skills acquired through long practice of repetition of similar tasks, which are displayed unconsciously as abilities to respond spontaneously to changing circumstances (Raphals 1992). Understandings of mindlessness in literature support this notion as a tendency to automatically hold on to rigid single-perspectives, rules and categories through repetition and practice (Langer 2014).

Hart et al. (2013) shed light on how mindful and mindless mental states may already inhabit designing. They analysed the relations between: mindfulness as described by Langer (2014); the model by Kahneman (2011) of the two information-processing systems that govern mindfulness and mindlessness; and the theory of flow (Csikszentmihalyi, 1990). Kahneman's model describes two systems: (1) an automatic, unconscious and under-regulated *system1* (S1) at the core of which are emotions, that promotes mindlessness; and (2) a deliberate, conscious and self-regulated *system2* (S2) at the core of which is cognitive regulation, that engenders mindfulness. S1's emotions and intuitions create the foundation for choices made, and values and beliefs held. S2's self-regulation controls S1's impulses. Kahneman argues that S2 is deployed into action when information or questions that S1 cannot tackle are encountered, therefore introducing a mindful mode of consciousness to the mix. This event that

changes the quality of attention is similar to the concept of suspension (of habitual patterns), one of the three gestures of becoming aware as described by Depraz, Varela & Vermersch (2003). S2's deployment, according to Hart et al. (2013), is what can create the state of flow where, whilst immersion in the activity is semi-automatic and unaware of some surrounding events, at the same time there is openness and alertness to emerging and spontaneously arising creative insight. This suggests that designing intrinsically displays this balance of both automatic and mindful states of mind.

Following this logic, if values and beliefs are already imprinted in designing and emerge unconsciously along with skills acquired overtime, arguably the degree of tendency towards moral awareness or to interpersonal collaboration is likely pre-determined at that point. This is important to design as it is broadly substantiated that values and beliefs impact design choices. Strickfaden, Rodgers & Langdon (2006) state that:

> "The development of an artefact is inherently bound up with meanings, relationships, and value systems relative to the individuals creating them, and to the context of their immediate and external environments". (ibid, p.1)

Young, Blair & Cooper (2001) claim that designers need to be mindful of unconscious world-views and tacit assumptions. Akama (2012) insists that social and cultural values tend to be invisible and yet pervasive within the design process. Lawson (2006) stated that values and beliefs conform a designer's set of guiding principles and that they: influence the mental context and direct the framing of design problems; are at the root of designer's work satisfaction; seem to be associated with a higher level of design expertise; and are often manifested unconsciously. Thus, the potential impact on a designer's awareness, of more deliberate mindful activity is in spaces within the design process where values and beliefs held can be made visible and explicit, arguably transforming the embedded tendencies arising as *metic* intelligence.

The next section discusses openness as a shared interpersonal value of mindfulness and design, and explores an alternate view to the discussion of moral awareness in

design, away from the abstraction of values and focusing upon the experience of interconnectedness in systems.

4. Openness and interconnectedness

So far, it has been suggested that, in designing, degrees of mindful and mindless mental states emerge in tandem as distinct mental information-processing systems. Whilst mindful-awareness disposition appears to: be characteristic of creative individuals, be associated with moral awareness, and promote interpersonal abilities, Inácio & Gerardo (2006) contend that the impact that designer actions have in the world "most of the times is a negative one, not only in social-cultural aspects, but also in an environmental perspective" (ibid, p.1). Moreover, this impact continues in spite of designers having access to the information of how not to impact the world in a negative way (ibid). Young (2012) proposes a way to address this in design educational contexts:

> "Engagement in socially responsible service design projects with communities of practice is the prerequisite learning method, supported by immersion in evolving heuristics that foster enkratic[1] co-design practice". (ibid)

This paper seeks to formulate an approach and contribute to such evolving heuristics. Considering that *metic* tendencies surface as a knowing-in-practice associated with the flow of designing, and that they are driven by a foundation of automatic emerging values and beliefs that impact design choices, then, as discussed, at that point the degree of moral and relational tendencies are likely pre-determined. These embedded values must also be invisibly present at other times in the framing of the design problem where relevant information (including information on how not to impact the world in a negative way) is obtainable. Yet, the fact that the information is available does not mean that the information is considered. Martínez (2015) found that design students did not consider sustainability impact information unless pre-established moments of reflection were planned. This implication is important because it indicates that to enter into any discernment upon what the value choice may be for the designer, or how not to impact

[1] "An akratic person goes against reason as a result of some pathos ("emotion," "feeling"). Like the akratic, an enkratic person experiences a feeling that is contrary to reason; but unlike the akratic, he acts in accordance with reason" (Kraut, 2001).

the world in a negative way, there appears to be a need to create reflective spaces to engender receptivity to such information. From Martinez's findings it can be inferred that designers tend to act based upon unconscious values and beliefs held, influenced by factors such as the internal/external dilemmas of "wills" associated with the immediacy of expectations of the design problem brief (Inácio & Gerardo, 2006). Arguably, this leaves any socially innovative, sustainable or moral tendencies, invisible.

The judgment upon what is moral is a complex inquiry that can lead to abstraction of values and imposition of ideologies (Akama, 2012). In the view of Inácio & Gerardo (2006) ideally, the "enlightened" designer would make well-informed formations of intentions and decisions on the best course of action, and would act accordingly. But what is the best course of action? Ethics are not in our biology (Dilnot, 2010), and ethical decisions in the professional realm are influenced by diverse factors, one of which is changes and variations in cultural values and beliefs (Gardner, Csikszentmihalyi & Damon, 2001). Within the framework of mindfulness, this paper explores an alternate, more timeless view to moral awareness, the subjective experience of interconnectedness.

Siegel (2012) explains that moral imagination and behaviour arise from the subjective experience of interconnectedness. This refers to the experience of meaningful connections with other people, communities, places or concepts. It is an understanding that arises from systems thinking perspectives of an experienced sense of closeness as opposed to a rational view. Moreover, this also refers to the subjective experience and definition of the self. The self is "in scientific fact, both an embodied and a relational process" (ibid, p.390). Similarly, in the context of the traditional view of mindfulness, Nhat Hanh (1975) explains that contemplation on interdependence is one of the ways to arrive at liberation from narrow views. He urges a recall of a "simple and ancient truth":

> "[T]he subject of knowledge cannot exist independently from the object of knowledge … When the object of knowledge (the something) is not present, there can be no subject of knowledge. The practitioner meditates on mind and,

> by so doing, is able to see the interdependence of the subject of knowledge and the object of knowledge". (p.45)

Akama (2015) proposes a similar view of the self as a function of its relational qualities. She offers an interpretation of the Japanese concept of *Ma* as "between-ness", to transcend paradigms that separate "prefigured boundaries" such as "self" and "other". She also suggests that attuning to relational dynamics situates the designer in "inter-relatedness", builds awareness of the multiple dimensions where designing happens, and forges aware relational connections that bring forth openness (ibid). This suggests that systems perspectives must expand to include perceptions of the multiple ways in which a self can be defined. Goleman & Senge (2014) allude to this notion:

> "The more we understand the process of developing systems intelligence, the more we see the close connections between understanding self, understanding other, and understanding the larger systems to which we all belong". (loc.504)

Capra & Luisi (2014) make a similar point. According to them, the configuration of a system is a "pattern of relationships within an organized whole" (p.9). They refer to integrative design as "systems thinking in action" and explain that to understand ecological interdependence, relationships must be understood and nourished. This view makes reference to natural and social communities that this paper will refer to as *external systems views*. Yet, they extend the systemic understanding of life to "the inner world of reflective consciousness, which contains a multitude of interrelated characteristics" (p.304). They propose that discrete inner conceptions of the self are real and yet, are not separate entities or structures. This paper will refer to this perspective as *internal systems views*. Stowell & Welch (2012) describe a system's existence as a description of systemic qualities perceived by an observer. As understood in this paper, in external systems the distinct components are (for example) stakeholders, their perspectives and how they relate; in internal systems the distinct components are the different aspects of the self, their values and how they relate. Receptivity to dynamic internal multiple views, potentially highlights the recognition that, parallel to external system views of communities, an individual is a network of interconnected self-

conceptions, or self-aspects (McConnell, 2011) some of which may have seemingly contradicting values (Siegel, 2012). Langer (2014) suggests that conflicting information that emerges through mindful-awareness "throws the discussion back to where it belongs: on individual values" (p.199). Prospectively, this can promote more informed perceptions (ibid), and a visibility of the workings of the system gathered from multiple points that clarify their dynamics (Goleman, 2013). In other words, this may promote recognition that one aspect of the observed system is not the totality of a systemic reality and that more aspects and their interconnectedness draw nearer to a more complete definition of it. This infers that, in internal systems views, a designer can experience interconnectedness directly through the recognition of multiple self-conceptions with discrete (and sometimes contradicting) values, within one self-entity.

Openness to such dynamic perspectives and to new information is an important feature of systems thinking, co-creation, social innovation, mindfulness, and of design. Openness is considered a shared attribute of the varied constructs of mindfulness in research literature (Hart et al., 2013). Langer (2014) asserts that openness to multiple perspectives is an essential ingredient in mindfulness. Siegel (2010; 2012) refers to openness as an embrace of uncertainty and as a way of being receptive in the experience of connection with others, with our inner world, and to the unfolding of possibilities. From the perspective of design, Akama & Prendiville (2013) describe that the addition of the two letters, "co" in co-designing indicate an openness to "embrace the influence, interventions, disruptions, tensions and uncertainties brought to bear by other things and people" (p.32). Akama (2015) says that designers can learn to pursue uncertain paths towards openness, welcome the chance to be open for contingency, and become together through interrelatedness.

According to Scharmer & Katrin (2013), the behaviour of systems can only be transmuted by transforming the individual and collective quality of attention that people apply to their actions within those systems. Moreover, in the context of co-design, literature describes the influencing role of the designer (or design team) as a facilitator instead of an individual creator, in a process where all stakeholders are participating directly in the creation of the design outcome (Maase & Dorst, 2006; Young, 2012;

Hocking, 2011). If the designer is a facilitator leading a co-design process, then there is ample potential to promote mindful-awareness through the design component. Goleman (2013) claims that teams excel when their facilitators promote three essential attention abilities: (1) *inner-focus*, which fosters self-awareness, self-management and attunes our guiding values (2) *other-focus*, which fosters empathic-awareness, and (3) *outer-focus*, which fosters external systems awareness. Arguably, a designer can greatly impact participatory states of mind. Cooke (2001) refers to the role of the facilitator in participation as the “interventionist”. He explains:

> "There is nothing in participatory processes themselves that brings about a particular state of consciousness; rather, that state is shaped by the interventionist". (ibid, p.120)

This seemingly strong influence presents an opportunity for design to set a cohesive tone through mindfulness as opposed to a potentially coercive one through egotism.

Based on the preceding review and analysis, openness is described in this paper as receptivity to dynamic multiple perspectives to support visibility of interconnectedness in external and internal systems. It is suggested here that co-creative external systems views (that consider natural and social communities), should be complemented with reflective spaces that promote internal systems views (in order to include the diverse facets of the self as a system of interconnected aspects). In such a reflective space designers can potentially know more to consider more, and learn to “respond adaptively to situations rather than automatically, and on impulse” (Hart et al., 2013, p.28).

Following the systems thinking perspective, mindful framing of internal views should encourage the discovery of previously unobserved self-aspects as novel and attend to the relations between such aspects. This process is akin to the concept of *consciousness integration*, as conceived by Siegel (2009; 2010; 2012). Holding in awareness a “tension of seemingly contradictory things”, a kind of embracing of opposites, is part of what Siegel defines as integration. It is an undertaking that addresses the complexity of systems by differentiation (discovering unobserved aspects

as novel), and linking (discovering interrelatedness). An essential feature of this activity is that, as a visual metaphor, contents of inner perception radiate out of a hub of awareness, or observing-self, as the base linking entity that aids the experience of recognizing the dual discrete/interrelated quality of subjects and objects of awareness. This process, as mindfulness, is also described as “intra-personal attunement” and it is associated with neural integration that enables flexibility and promotes a person’s capacity for rewarding interpersonal relationships (Siegel, 2007).

5. Conclusive remarks

The analysis in this paper has aimed to bridge mindfulness and design by discussing openness and interconnectedness as shared attributes between both. The connections illustrated in this document are expected to serve as a concrete base to a developing study that aims to assess the potential impact of heuristic reflective spaces within design academic contexts that foster internal systems views as described. The process is based on the concept of consciousness integration. A distinction was made between internal (self-aspect perspectives) and external (stakeholder perspectives) systems views. This is important because whilst consideration of dynamic multiple perspectives, is a shared value of internal and external views, mindful qualities of attention emerge out of internal attuning and self-regulation of individuals to permeate relational contexts and foster interpersonal benefits (Siegel, 2012; Parker, Nelson, Epel & Siegel, 2015).

Success in such a process of improving awareness and suspending habitual patterns of perception requires disciplined methodologies and social mediation (Varela, 2000). In this sense if the design of heuristic tools to foster reflective spaces as described in this paper, impact a designer’s awareness, then this can potentially support sustainable development of mindful-awareness aptitudes in design academic contexts.

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A design-relevant mindfulness device

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Abstract: This paper delineates a study that aims to describe the development and measure the effects of a design-relevant mindfulness device. The relational nature of design and particularly multidisciplinary collaboration, implies that designers would benefit from the development of interpersonal skills. Science suggests that one of the benefits of mindfulness is improved interpersonal skills which could lead to enhanced cooperation disposition. The mindfulness device becomes relevant to design through a process of intra-personal attuning that focuses attention on embedded values which impact awareness. The study aims to determine whether engagement with the device has significant effects on, and noteworthy correlations between aspects of mindfulness and of cooperation. Moreover, the study will generate reflective output that is expected to map designers' conscious and subconscious values. This paper also explores how developing this skill may transform a designer's relationship with tacit knowledge arising in intuitive design moments.

Keywords: Mindfulness, Design Skills, Design Learning

1. Introduction

Design literature refers to mindfulness as a competence that should be explicit in design academic settings to support contemporary co-creative approaches (Howard & Melles, 2011; Owen, 2007; Norman, 2010; Young, 2012). The relational nature of design and especially on multidisciplinary collaboration, presupposes that designers would benefit from the development of interpersonal skills. Mindfulness disposition has been associated with improved interpersonal relationships (Siegel, 2012). Furthermore, mindfulness literature suggests that the qualities that characterize a mindful-attitude are also characteristic of creative thinking (Langer, 2014; Langer & Piper, 1987). It would be reasonable to infer from these statements, that the nature of a designer's training and experience would promote mindful-awareness disposition and therefore enhanced interpersonal skills. It could be argued that experience in design helps develop mindful attitudes overtime. Yet, the clash of egos has also been put forward as a core dysfunction of collaboration-based design activity (Vyas & Young, 2011; Young, 2012).

In this light, this paper delineates the design of a study that aims to describe and measure the effects of a mindfulness device in a way that is relevant to design. From this perspective, this doctoral project seeks to: (1) recount the iterative process of development of a design-relevant mindfulness device; and (2) establish whether this application of mindfulness yields significant results in reference

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to tendencies towards mindful awareness, and towards cooperation. It is the interest of this doctoral project that the mindfulness device: (a) embodies recognized components of mindfulness practice which are pertinent to design; and (b) that its application yields results that establish whether they validate its fostering of the described tendencies, and the potential correlations between discrete facets of mindful and of cooperative attitudes.

This paper is organized around two general topics: (1) the rationale behind the evolution and composition of the design-relevant mindfulness device, and (2) the study's proposed data generation, measurement and analysis. This paper also concludes that a mindful process of self-exploration may transform subconscious aspects thought to impact design decisions and therefore encourage innovation.

2. A Design-Relevant Mindfulness Device

2.1 Intra-personal attuning as Mindfulness

Mindfulness, as a disciplined practice based on Eastern philosophy, leading to certain mind states or attitudes, and its resulting physiological and psychological effects is currently widely discussed in research literature as well as in mainstream media. It can be viewed as ways to train the mind to focus attention in particular ways (Siegel, 2010; 2012), and thus encourage decision-making to be less automatic, or less mindless (Langer, 2014). Overviews of the varied descriptions and research streams around the concept, as well as critical analysis of the interrelationships between aspects of mindfulness and of design have been discussed in depth in previous publications (Rojas, English, Young & Spencer 2015; 2016). As part of this doctoral programme, approaches to mindfulness were analysed and explored in an effort to adapt and integrate a form of the discipline to design contexts. The study's final version of the mindfulness device follows a perspective that suggests that mindful qualities of attention emerge out of intra-personal attuning of individuals to permeate relational contexts and foster interpersonal benefits (Siegel, 2007; 2009; 2012; Parker, Nelson, Epel & Siegel, 2015).

Siegel (2010; 2012) devised the concept of The Wheel of Awareness (figure 1) as a form of mindfulness that fosters intra-personal attuning; a process that trains the mind to recognise and differentiate amongst diverse elements of self-perception the sense of knowing from the sense of that which is known. Another way to explain it is to view the individual self as a system and recognize the individualities that differentiate an "observing-self" (Deikman, 1982) from the object(s) of observation. From a systems perspective, upon differentiation then comes "linking" which is a task of acknowledging the relations between the objects of perception and of the observing entity as parts forming a complex whole. In the original Wheel of Awareness mindfulness exercise, the objects of observation are described as "senses": (1) the five senses (sight, hearing, olfaction, taste, and touch); (2) the sixth sense or interoception (perception of the interior of the body); (3) the seventh sense (thoughts, emotions, attitudes, beliefs); (4) the eighth or relational sense (sensations of our connections with others).

Siegel proposes that this practice promotes consciousness integration, and defines it as the linkage of differentiated parts of a complex system. In his view, non-integrated complex systems can lead to chaos, rigidity or both. In an integrated system, subsets of a collection of elements become unique (or specialized) in their individuality and then interact with each other to form a complex whole. This may lead to self-organization as an emergent property of the interactions of elements of the system. Finally, the functions of the elements are influenced by the emergent self-organization moving the

system towards 'maximizing complexity', or to harmonious interaction of unique elements (ibid). In the context of mindfulness, and of considering the self as a system, differentiation of discrete kinds of contents of the mind is activated by focused attention, linking an observing-self with an experiencing-self, and leading to internal (or intra-personal) and interpersonal attuning. Siegel explains:

> "Sensing the inner states of mind of another alters our own inner state. Therefore, looking toward our own inner world serves as the source of empathy for others' mental experience. Hence, reflection is both an inner and interpersonal gateway to insight, compassion, and empathy." (ibid)

In order to make the final version (figure 2) of the device relevant to design, the objects of observation are substituted for those that are thought to impact design choices: embedded personal and professional values and beliefs. This is rooted on the notion that most mental information processing is automatic (mindless) and that it's influenced by these values and beliefs held (Kahneman, 2011). A designer's set of personal and professional values and beliefs are considered important to the process of design, are said to emerge unconsciously, to impact, and to direct the framing of design problems (Akama, 2012; Lawson, 1997; Strickfaden, Rodgers & Langdon, 2006; Young, Blair & Cooper, 2001).

Upon engagement with the device, participants are encouraged to differentiate what seems important at the time of reflection and to assign those values to a role or self-aspect (McConnell, 2011) that is prevalent in their personal and/or professional realms. Capra & Luisi (2014) propose that diverse individual inner conceptions of the self are real and yet, are not separate entities. They frame this around a systems understanding of life, as an inner world of reflective consciousness containing a multitude of interrelated characteristics (ibid p.304). Conceivably, this process promotes a sense of interconnectedness where, like Siegel (2012) proposes, whilst some of the identities in an individual may have seemingly contradicting values, they are inherently part of the same complex self-system.

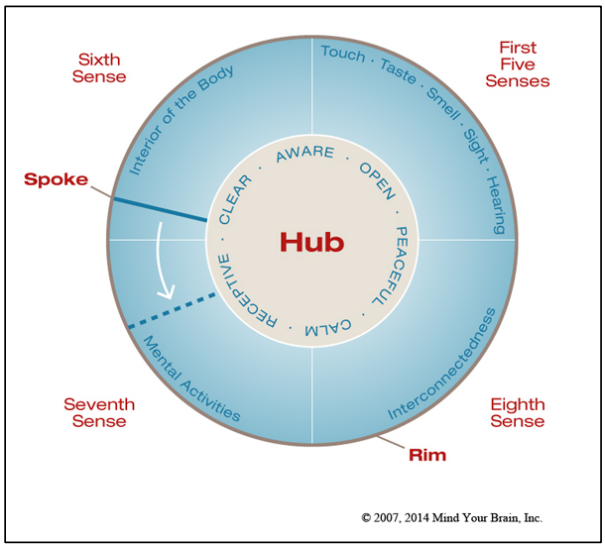

Figure 1. The Wheel of Awareness. "The hub represents the experience of awareness itself — knowing — while the rim contains all the points of anything we can become aware of, that which is known to us. We can send a spoke out to the rim to focus our attention on one point or another on the rim. In this way, the wheel of awareness becomes a visual metaphor for the integration of consciousness as we differentiate rim-elements and hub-awareness from each other and link them with our focus of attention" (Siegel, 2016).

Figure 2. The final design-relevant mindfulness device where the objects of attention are a designer's personal and professional values.

2.1 Early Iterations

In the initial stages of the application's development, adopting viewpoints of a mindfulness research stream known as socio-cognitive mindfulness (Yeganeh & Kolb, 2009; Djikic, 2014), master level design students were encouraged to capture stakeholder perspectives of their current collaborative project through dynamic visual maps in a reciprocal way. These reflections were named Reciprocal Perspectives (RP's), as the conceived mindful activity influenced by the concepts of re-categorizing and relabelling, in opposition to mindless rigid reliance on old categories (Langer, 2014). RP's, which also embody elements of Appreciative Inquiry (Cooperrider & Whitney, 1999), are understood as possibility propositions that bridge the best of "what-is" with collective speculation of "what-might-be". RP's describe what works in a system and change negative accounts into descriptive points of view and into new possibilities. The assumption for this approach is that a system is not a problem to be solved but a mystery to be embraced by paying attention to novelty and questioning assumptions. RP's were presented to design students in the following way:

- RP's describe and value what works in the current system and uses that as a base to envision what might be and dialogue what should be.
- RP's re-label negative accounts into descriptive points of view and/or into new possibilities. For example:
    - "The glass is half empty" to "the glass is half full"
    - "The glass is half empty" to "the glass has water"
    - "The glue does not adhere as expected" to "the glue adheres for a short amount of time"

Whilst this exercise clearly be viewed as a mindful process, it was determined that the device required an element which is deemed essential to the quality of attention people apply to their actions within systems; inner-focus or as referred to in this document, internal views (Goleman,

2013; Scharmer & Kaufer, 2013). Contemporary co-creative approaches promote that more stakeholders participate directly in the creation of a design outcome (Maase & Dorst, 2006; Young, 2012; Hocking, 2011) and whilst RP's promote mindful consideration of multiple stakeholders, they do not naturally include deliberate attention to the design component's internal views. Consideration of these multiple stakeholder perspectives are understood in this paper as external views from the standpoint of the design component. Internal views are understood as a self-observing capacity of individuals and teams in co-creative contexts, and described by Scharmer & Kaufer (2013) as a way to help a system see itself and connect to its emerging future self. This, in their view, is accomplished by connecting different views simultaneously, and "bending the beam of attention" back to the observing-self and to the sources of creativity.

A revised version of the mindfulness application reflected this attempt to scrutinise internal views within the design problem framing by highlighting the role of the design component within a framework of stakeholders called the creative consortia (Spencer, 2015). This framework is conceived whilst operating under the recognition that multidisciplinary and multi-stakeholder collaborative teams are the best way to co-create for social innovation. It comprises 4 pillars of a quadruple helix for the creation of social value that are: society (citizens), university (student design team), industry and government. Here, they suggest design acts as a connector-integrator to create the right environment for collaboration. If in a co-creative context, the design component leads the design process and collaboration effort, then arguably, it is through this design component that mindfulness elements must be integrated. Goleman (2013) describes a leader's Triple Focus as vital attention abilities. These are: (1) inner-focus, which fosters self-awareness and self-management, (2) other-focus, which fosters empathic-awareness, and (3) outer-focus, which fosters systems awareness. He states:

> "Inner focus attunes us to our intuitions, guiding values, and better decisions. Other focus smooths our connections to the people in our lives. And outer focus lets us navigate in the larger world. A leader tuned out of his internal world will be rudderless; one blind to the world of others will be clueless; those indifferent to the larger systems within which they operate will be blindsided." (Goleman, ibid)

Co-creation in the context of the creative consortia is by definition an approach that aims for sustainable systems awareness and social innovation outcomes. Therefore, the outer-focus is assumed to be the genesis of the scope of a co-creative process that aims for social innovation. The relevant additional attention-training aims would apply to the inner-focus and other-focus of the design component and stakeholders in their participatory interactions. The concept of the creative consortia is a proposition for managing complexity of a multi-stakeholder value system. This approach posited that design, as a connector-integrator, can promote integration through an adaptation of The Wheel of Awareness as described previously. If this concept is interpreted and extrapolated to understand the creative consortia as a complex stakeholder system, how can this system be integrated through mindful intervention of a design connector-integrator?

The discrete aspects of this system (to be differentiated) are people with values pertinent to their multiple roles or identities; and the way they interact (link) is through communication. Consequently, attuned-communication, defined by Siegel (2012) as the quality of integrative relationships in which differences are respected and compassionate connections are cultivated, is a highly desired outcome. In the original wheel model the hub represents space to pause and reflect. This application proposed an adapted visual metaphor, where the hub is the design connector-integrator, providing the space for recognition of all stakeholders' uniqueness and encouraging attuned connections. The process aimed to promote attuned communication through differentiation and linkage of the

components of the creative consortia, where the discrete components are people recognizing their roles and values, whose interaction is through communication. The metaphoric hub is the design component, as the connector-integrator, and the constituents of the rim are stakeholder members of society (citizens), industry and government as it may relate to the particular design brief (figure 3).

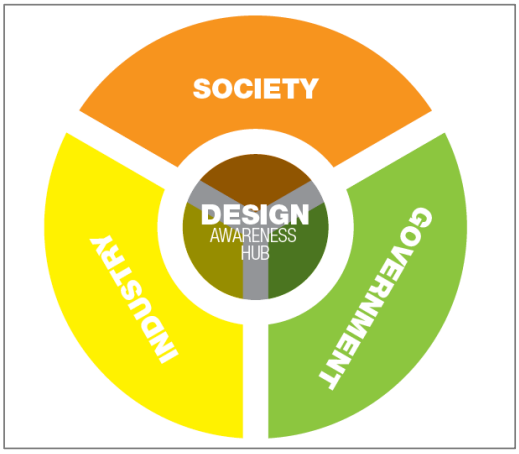

Figure 3. The creative consortia with the design component as a connector-integrator as the hub, and industry, society and government as constituents of the rim.

Students were encouraged to capture stakeholder perspectives using internal and external system views as the mindfulness component. External systems views consist of the project brief sets of stakeholder perspectives including the design team as a stakeholder set (and as the source of internal systems views). Internal systems views consist of a designer's personal and professional values and beliefs. Ideally, as the map grows and morphs dynamically, and categories form to clarify values further, each category becomes a new centre-of-inquiry (figure 4).

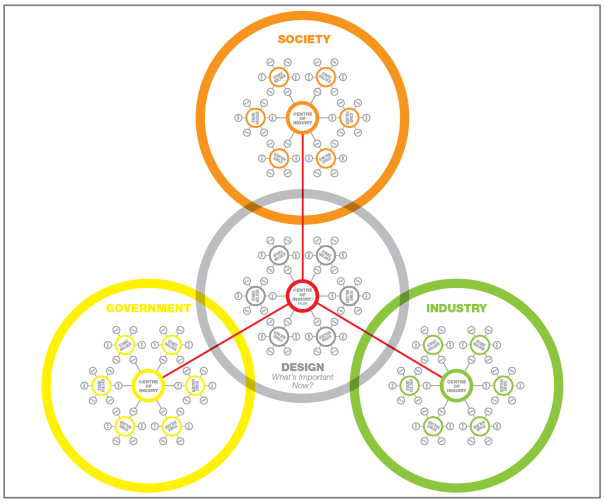

Figure 4. Each centre-of-inquiry around the design hub is a distinct radiant mind map.

These initial conceptualizations of the intervention within a design class, visualized the device as a design problem framing tool imbued with mindfulness techniques. The goal was to effectively

include internal views as part of the considered design problem context. This process appeared to be perceived as foreign or unnatural, and bring too many aspects for consideration and interpretation by the students when added to other new processes of learning collaboration-based design approaches running in tandem. It seemed bound to cause confusion and to be viewed as a burden.

This lead to the final iteration of the device which whilst it promotes a mind training discipline relevant to design concerns, for the purpose of the study it remains less intrusive, does not interfere directly, yet runs parallel to other current taught approaches as a process of discovery of unobserved individual values and beliefs. Ultimately, the interest of the study is to determine whether the design-relevant mindfulness device has significant effects and/or correlations between mindful and cooperative disposition. In this case opportunities are potentially created for the prospective evolution of self-contained academic tools pertinent to design which foster distinct skills and behaviours in design students.

2.2 Final Mindfulness Device

To engage with the device, participants are asked to find a time every day to reflect with the following guide. Since this is a new discipline that aims to be inserted in a daily schedule, it was suggested that reflection times be attached to an existing daily discipline (i.e. before or after a meal, or upon arrival to school or work, or before going to bed, etc.):

Step 1: A Self is understood as a role or identity. Start with an Observing Self node and split it in two categories: Personal and Professional. The Observing Self represents the entity from where you are able to see your other roles. For example, you can identify one of your Professional Selves as a Design Team Member; and a Personal Self as a Cycling Enthusiast. And you can observe both from your Observing Self role.

Step 2: Bring your awareness to your Observing Self role and ask yourself: What seems important now (to either a personal or professional self)? See what arises. There are no wrong answers. For example, let's say your first thought was: "I'm concerned that the due date is approaching and we need to finish the concept". Now select a self, or role or identity in your life you think this can belong to. For instance, this particular concern can belong to a Design Team Member Self, which is a Professional Self.

Step 3: Now decide what value you think this first concern belongs to. It may help to consider it as "an appreciation for..." or "a belief in...". In this example Timeliness was chosen. Choose a value you are comfortable describing. Again, there are no wrong answers. Since this is a daily exercise, it is possible that values might refine overtime. Go back to your Observing Self role and ask yourself the question again: What else seems important now? See what arises.

Step 4: It is up to you to discover which Self and which Value, your next thought belongs to. In this example, for illustration purposes, Cycling was chosen as the Self (personal) to which the second thought or concern belongs to. And the value, Discipline. This is assuming you were a cycling enthusiast and your next thought was about keeping up with your training.

To complete the exercise for the day, participants are asked to complete a form with the selves and the values arising from the reflection. A minimum of two (2) Self/Value combos are suggested, but they were encouraged to do as many as time and their comfort allows. The reflection output for the examples offered would be:

- Self or Role: Design Team Member | Value: Timeliness; and
- Self or Role: Cycling | Value: Discipline

This reflection content offers insight on what participants discern to be significant in their perception as they move between their designing role and other life identities. As a mindfulness exercise, the activity promotes recognition and differentiation of the knower (the Observing-Self) from the known (the Object of Observation). Relevance to design is accomplished by making the objects of observation to be elements that impact design choices: personal and professional values and beliefs.

Starting from their understanding of what the experience of the Observing-Self is, potentially promotes a reflective process that encourages points of view that are not habitual. Waiting to see what arises as important, creates a mental space between the question and the next emerging thought. And matching the value to a personal or professional role that they perceive it belongs to, offers an experience opportunity of recognition of a self with a multitude of interrelated aspects.

To measure the effects and correlations of this engagement, the study design is experimental comparing test and control groups with pre-test/post-test interventions.

3. The Study

This doctoral project seeks to establish whether a design-relevant mindfulness device in collaboration-based design contexts, yields significant transformational and correlational results. Such results will be considered in the context of both general and discrete tendencies: (1) towards mindful awareness; and (2) towards cooperation. The experimental study consists of a mindful awareness device adapted to be relevant to design concerns, together with the application of two instruments, widely recognized in research, measuring facets of mindfulness and modes of conflict-resolution.

The mindfulness instrument is known as the Five Facet Mindfulness Questionnaire (FFMQ) and has been used in numerous mindfulness studies (Park, Reilly-Spong & Gross, 2013). The instrument is based on five independently developed mindfulness questionnaires that are bound together in a factor analytic study. The study posits five clear and interpretable facets of mindfulness: observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience (Baer, 2006). Further studies have supported the FFMQ's construct validity (Baer, Smith, Lykins, Button, Krietemeyer, Sauer, Walsh, Duggan & Williams, 2008; Baer, Samuel & Lykins, 2011).

The conflict-resolution instrument, known as the Thomas-Kilmann Conflict Mode Instrument (TKI), has been refined over 40 years to reduce social desirability bias (Kilmann & Thomas, 1977). This instrument is designed to differentiate between specific intentions for handling conflict, and identifies five main modes of resolution: competing; accommodating; avoiding; collaborating; and compromising. These five modes are defined according to two basic behavioural dimensions of assertiveness and cooperativeness (Kilmann & Thomas, 1975; Thomas & Kilmann, 1978).

The general transformational context refers to the measurement of overall tendency towards mindfulness disposition (FFMQ), and of overall tendency towards either assertiveness or to cooperativeness in conflict situations (TKI). Assertiveness is understood as an attempt to satisfy one's own concerns via a more egocentric approach, whilst cooperativeness is understood as an attempt to satisfy others' concerns via a more eco-centric approach (TKI). It would be reasonable to assert that a tendency towards cooperation would be a more desired approach in a multi-stakeholder co-creative endeavour. Transformation will also be measured in the context of discrete or individual facets of mindfulness, and of modes of conflict-resolution. The facets are aspects from previous studies that appear to represent elements of mindfulness and they consist of: observing; describing; acting with awareness; non-judging of inner experience; and non-reactivity to inner experience (FFMQ). The described modes for responding to conflict situations consist of: competing; accommodating; avoiding; collaborating; and compromising (TKI). Potential correlations will then be drawn upon the measured results of individual facets and modes as described, to enable conclusions specific to the relationships between discrete elements representing tendencies towards mindful awareness and towards behaviour in situations of conflict.

Also, as discussed, reflective content is generated as part of engagement with the mindfulness application. This output is expected to offer a sense of what kinds of values designers perceive as important whilst moving between designing and non-designing roles.

4. Conclusive Remarks

Mindfulness, applied to design concerns, can be understood as way to promote more visibility and consideration of information impacting design choices. Personal and professional values and beliefs have been proposed by Lawson (1997; 2004) to constitute a set of design guiding principles developed overtime. These embedded values operate subconsciously and arise along with tacit skilled knowledge in designing. Thus, a mindfulness discipline encouraging that design guiding principles be made visible and explicit, can arguably impact a designer's awareness and transform subconscious tendencies that arise during the design process. Perhaps it could be said that the value of mindful awareness is not as a substitute to reactions, but as a skilled relationship with the inevitability of know-how arising in intuitive design moments such as flow, knowing-in-action or reflection-in-action. This study asks whether there is value in developing the skill to consciously explore these subconscious aspects.

English (2010) described a model (figure 5) for navigating fuzzy situations that draws together several theories of perception and communication. The Subjective Universal, where conceptual neural patterns are created from conscious and subconscious components, is where mindfulness can have transformational potential in the designing space.

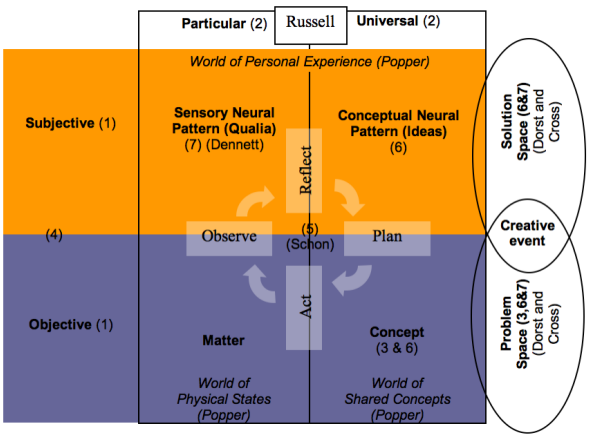

Figure 5. A model for navigating 'fuzzy situations' in the design space (English, 2010).

The authors contend that unobserved embedded values operating in the subconscious limit innovation potential. English (2006; 2007) suggests that the designer's awareness/consciousness is part of the design space. In this light, when presented with a design brief to design an iron, instead of asking just how to design an iron, a self-conscious designer would not include preconceived ideas and would ask how to remove creases from garments.

The experimental study expects to demonstrate whether a design-relevant mindfulness device, can effect significant transformation in mindful and cooperative attitudes in designers. Furthermore, it anticipates noteworthy correlations to be identified between independent facets of mindfulness and

that of cooperation modes. Lastly, the generated reflective output may inform on the kinds of values that emerge from designers moving between designing roles and other significant personal identities. The device contributes to design problem framing in that it allows the designer to navigate both conscious and unconscious values. Thus potentially imbuing the device and the concept with published research support to initiate an academic conversation regarding the device as a base for new academic design experiences. Future research can then explore refinements, self-contained interventions (as opposed to parallel engagement with other learning activities), further implications and long-term value.

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Appendix B
RESEARCH AUDIT TRAIL

Contents

B.1 Introduction

Part of the contribution of this study, in relation to the inquiry explored by research question RQ3, is a method to generate unique data and develop theoretical categorisations about designers' evolving values. This Appendix contains the document presented to peers for review and the results of the audit.

B.2 Audit Trail Document

Introduction

This document presents a research audit trail for peer examination in order to improve the trustworthiness of the qualitative research (Carcary, 2009) conducted in this programme. The general purpose of this process is that another researcher can follow the decision trail and arrive at, at least similar, but not contradictory conclusions (Sandelowski, 1986).

Background

The research study's general aim is to explore how to make mindfulness more explicit in design education (Young, 2012). The programme focused on the development and implementation of a design-relevant mindfulness-based tool. One of the tool's properties is that it generates unique data that stems from the tool's object of mindful inquiry: Design Guiding Principles. These are described as designers' personal and professional values and beliefs (Lawson, 2006). He stated that personal and professional values and beliefs comprise a designer's set of guiding principles and that they: influence the mental context and direct the framing of design problems; are at the root of designer's work satisfaction; seem to be associated with a higher level of design expertise; and are often manifested unconsciously. This data provides the opportunity to analyse what motivates designers in particular contexts, in this case, design students in a multi-disciplinary innovation master program.

Research Methodology

The study is titled: A Design-Relevant Mindfulness-Based Intervention and its context is collaboration-based Design. This is a case study incorporating multiple units of analysis with an overarching constructivist research stance.

The collected data consists of multiple submissions stemming from engagement with a mindful reflection tool inquiring into participants' personal and professional values following a *precoded* data generation method (Lavrakas, 2008). *Precoded* data refers to survey items for which categories are identified prior to data collection activities. A suggested benefit of the use of such *precoded* inquiry is that the data is coded as it is collected thus potentially reducing classification inconsistencies. In this case, the process is used to recognize the context in which the data is being collected. With personal and professional values as the base category framework, the output for each engagement is comprised of two parts: (1) *Role (or Self)*: Identity (i.e. designer, runner, friend) associated with a value; (2) *Value*: Meaningful motivational goal or principle (i.e. balance, dedication, openness) associated with a role. The role contextualizes the expressed meaningful concern; for example: *Commitment* has a different frame of reference from the perspective of the role of a *Runner* than from the role of a *Husband*.

Data Collection

To arrive at the *precoded* output, participants were invited to engage in a daily reflective inquiry with the following instructions:

STEP 1: Ask yourself the following question:

WHAT SEEMS IMPORTANT NOW FROM THE PERSPECTIVE OF MY ROLE AS DESIGNER IN A COLLABORATIVE SETTING?

Pause. Be alert to what arises. ¿To what value does this concern belong to? It may help to consider it as " an appreciation for ... " or " a belief in ... ".

For example: If my thought was: *"I'm concerned that the workload is unbalanced amongst team members"*; then I may choose “FAIRNESS” as the value. The role (or self) is “DESIGNER”.

So, for STEP-ONE the submission would be: SELF*: Designer | VALUE: Fairness

STEP 2: Ask yourself the following question:

WHAT ELSE SEEMS IMPORTANT NOW FROM THE PERSPECTIVE OF ANY OF MY OTHER ROLES?

Pause. Be alert to what arises. ¿To what role and to what value does this concern belong to?

For example: If my thought was: *"I need to keep up with my cycling training schedule"*. Then I may choose “DISCIPLINE” as the value, and “CYCLIST” as the role (or self).

So, for STEP-TWO the submission would be: SELF*: Cyclist | VALUE: Discipline

**The term SELF is used because in the initial induction participants were exposed to an overview of the concept of the “Observing-Self” as one construct of self-perception which helps distinguish between awareness and the contents of awareness (Deikman, 1982).*

Analysis

Output stemming from engagement with the tool totalled 637 sets of role/value submissions (i.e. Runner: Commitment) from 14 participant students over a period of 30 calendar days. These data units were then analysed to establish emergent categories. Constructivist premises foster openness in a grounded theory approach where a theoretical

framework should not be imposed on the data (Charmaz, 2008). Furthermore, to create the conditions for emergent inquiry, the grounded theory method should display two properties: (1) systematic scrutiny of data; and (2) development and checking of categories (ibid). Initially, value categorization literature was examined to consider suitable categorization models to apply to the data, yet these did not capture this study's context and seemed imposed. An interpretivist stance includes context as a variable and considers it critical (Klein and Myers, 1999). In this light, categories for this data set emerged through scrutiny by asking systematic questions (Glaser, 1978, p. 57).

Categories

Roles (or Selves) were generalised into the following categories:

- Designer: Role as Multi-Disciplinary Innovation master design student.
- Non-Design Professional: Role as a professional in a field other than Design. (i.e. Filmmaker, Entrepreneur, Language Tutor).
- Personal Relational: Role within close personal relationships. (Sister, Girlfriend, Husband, Granddaughter).
- Personal Skill/Hobby: Role within leisure activities. (i.e. Runner, Knitter, Gamer).
- Personal Individual/Reflective: Abstract introspective roles. (i.e. Person, Me, Mental-self, Individual).
- Student: Role within master's student general academic experience.

Values, according to Iversen & Leong (2012) are generally understood and categorised as:

- End-states, or aspirations, and
- Modes of conduct, or attributes

Stemming from systematic inquiry, values were categorised into four major categories amongst two dimensions. The main terms for each of the categories were chosen to represent the general category description. Thus, the intent of these terms is representational as science suggests that different areas of the brain represent related semantic concepts (Huth et. al, 2016). For example: the term "proficiency" was considered as well as "efficacy"; and the term "interpersonal relations" was considered as well as "relationality".

The significance to Design, of engaging with this mindful inquiry tool becomes more evident considering that high-creative thinking ability is related to the connectivity of different areas of the brain (Beaty et. al, 2018).

Each of the role/value sets should fall into one of the following categories and ultimately conform a multi-disciplinary collaboration-based design guiding principles framework:

- *Attributes*:
    - Efficacy: Personal or professional quality promoting the ability to produce a desired or intended result.
    - Relationality: Personal or professional quality promoting harmonious or cooperative interactions in human relationships.

- *Aspirations*:
    - Development: Desire for personal or professional continued learning or knowledge acquisition.
    - Achievement: Desire for personal or professional success.

To arrive at the four major categories a systematic inquiry was followed. The following questions helped establish context and identify emergent categories:

- *Is this an attribute (understood as a quality, characteristic or trait); or an aspiration (understood as a desire, expectation or goal).*
- *From the perspective of what kind of personal/professional role is this? And/or,*
- *From the perspective of this role, what kind of value is this?*

The example below demonstrates how the results of this systematic inquiry helped arrive at the general category descriptions:

Role/Value unit	Initial Concept	Role Category	Category
Runner : Commitment	A personal attribute promoting discipline in a sport.	Personal Skill / Hobby	Efficacy: Personal or professional quality promoting the ability to produce a desired or intended result.
MDI Team Member : Money	A professional aspiration for financial prosperity.	Designer	Achievement: Desire for personal or professional success.

Friend : Communication	A personal attribute promoting a forthcoming relationship.	Personal / Relational	Relationality: Personal or professional quality promoting harmonious or cooperative interactions in human relationships.
Myself : Learning	A desire for personal improvement through schooling or life experiences.	Personal Individual / Reflective	Development: Desire for personal or professional continued learning or knowledge acquisition.

The process of categorising took multiple reconsiderations since some role/value sets could arguably be considered to fall into more than one category. For example: UNDERSTANDING as a value from the perspective of the role of FRIEND, can be considered both a personal attribute to produce an intended result; or a personal attribute to promote harmony in a relationship. In this case, RELATIONALITY would be chosen as it appears to be more relevant to that category.

As part of this peer review, a random sample of data units was selected so that the reviewer can experience and weigh-in on the process of assigning role/vale sets to the emerging categories. An online form was developed where the reviewer can assign categories to the selection of data units. An essential part of this process is to reconsider the category choices and resubmit the form several times as this was the actual undertaking in which categories were refined in the study.

Follow this link: https://goo.gl/forms/PSjGI9yuTCp22lOV2 to assign categories to a selection of data units and please remember to reconsider and resubmit your selections a few times until you feel reasonably satisfied with your selections. Thank you very much for your time and support.

Instructions on the online form

The instructions on the online form[1] read as follows:

> *Below is a random sample of data units selected so that the reviewer can experience and weigh-in on the process of assigning role/vale sets to emerging categories. Choose the category that you think is the best fit to each role/value unit.*
>
> *:: For example ::*
> *Role: HUSBAND | Value: COMMITMENT.*
>
> *The first question to ask is: Is this an Attribute or an Aspiration?*
>
> *If it is an ATTRIBUTE (or quality) then it is either:*
> *- EFFICACY: a quality promoting the ability to produce a desired or intended result, or*

[1] Retrieved from https://goo.gl/forms/PSjGI9yuTCp22lOV2

- RELATIONALITY: a quality promoting harmonious or cooperative interactions in human relationships

If it is an ASPIRATION (or desire) then it is either:
- DEVELOPMENT: a desire for continued learning or knowledge acquisition, or
- ACHIEVEMENT: a desire for success

The category that best represents this example role/value unit is: RELATIONALITY: Personal or professional quality promoting harmonious or cooperative interactions in human relationships.

All choice options include a space for "OTHER", in the event the reviewer wants to comment on a specific instance. At the end of this exercise, another space is provided for additional optional comments.

The process of categorising took multiple reconsiderations as some role/value sets could arguably be considered to fall in more than one category. For example: UNDERSTANDING as a value from the perspective of the role of FRIEND, can be considered both a personal attribute to produce an intended result; or a personal attribute to promote harmony in a relationship. In this case, RELATIONALITY would be chosen as it appears to be more relevant to that category.

Please remember to reconsider and resubmit your selections a few times until you feel reasonably satisfied with your selections.

Thank you very much for your time and support.

Following the invitation to experience the process, the following questions were asked:

- *Do you agree with the general value categories in relation to the specific roles and values?*
- *Do you think anything should be changed or reconsidered?*
- *Do you think anything should be added?*

B.3 Results of the Peer Review

The resulting submissions revealed a general agreement with the categorisation process. In the experience of categorisation itself, the reviewers assigning categories also resulted in similar results with each other, and with this researcher's conclusions. Where different categories were chosen, this was largely due to different interpretations of a value aspect. For example, one of the options was to classify the role/value set with the available options in the table below:

Table 17. Role/Value Set Classification Sample
Self: DESIGNER; Value: INNOVATION
a. EFFICACY: Personal or professional quality promoting the ability to produce a desired or intended result. b. RELATIONALITY: Personal or professional quality promoting harmonious or cooperative interactions in human relationships. c. DEVELOPMENT: Desire for personal or professional continued learning or knowledge acquisition. d. ACHIEVEMENT: Desire for personal or professional success. e. Other: _____

Some peers interpreted INNOVATION as an attribute, where the Researcher interpreted it as an aspiration. The chosen value aspect determines the category, so when INNOVATION is considered an attribute it falls in the EFFICACY category; when it is considered an aspiration, it falls in the category of ACHIEVEMENT.

This shows that some disagreement can occur even though the study was designed to minimize classification inconsistencies. It is possible for a future study to consider adding value aspects (attribute or aspiration) to the predetermining of codes, so that participants can more clearly establish the context of their submission.

Another pertinent element arising from the review, was the possibility of an additional category surrounding WELLBEING. The actual feedback from the reviewer read:

> *I think the categories are largely a good fit. I think there could potentially be a category surrounding personal wellbeing, but I'm not sure whether it would be beneficial or if it would just fit within the current definition of efficacy.*

This was interesting because during the coding process, WELLBEING, WELLNESS and SELF-CARE were considered as potential categories. Whilst some value entries (such as HEALTH or WELLNESS), could potentially fit this category, the available submissions arguably seem to fit well with EFFICACY or ACHIEVEMENT. Also, the amount of entries with direct relevance to a WELLBEING category was nominal. So, as it pertains to this study, values of WELLBEING are contained within a category that encompasses a larger scope.

Appendix C
FUTURE QUANTITATIVE POSSIBILITIES

Contents

C.1 Introduction

A number of further research opportunities emerge from expanding aspects of this study with larger participant samples in order to implement complementary quantitative methods for data analysis.

Whilst this thesis presents rich qualitative data suitable for a case-study, the sample size would need to be larger (Delice 2010) in order to be statistically significant.

C.2 Correlating Mindfulness and Cooperation

A future study could use quantitative methods to seek to establish whether the design-relevant mindfulness device yields significant transformational and correlational results in collaborative design contexts. To measure these effects and correlations the study design can be experimental comparing test and control groups with pre-test/post-test interventions.

Such results can be considered in the context of both general and discrete tendencies:

- towards mindful awareness; and
- towards cooperation.

This is possible with the application of two instruments widely recognized in research: A Mindfulness instrument measuring facets of mindfulness, and a Cooperation instrument measuring modes of conflict-resolution.

The mindfulness instrument is known as the Five Facet Mindfulness Questionnaire (FFMQ) and has been used in numerous mindfulness studies (Park, Reilly-Spong & Gross 2013). The instrument is based on five independently developed mindfulness questionnaires that are bound together in a factor analytic study (Baer 2006).

The study posits five clear and interpretable facets of mindfulness:

- observing,
- describing,
- acting with awareness,
- non-judging of inner experience, and
- non-reactivity to inner experience.

Further studies have supported construct validity for the the FFMQ (Baer, Smith, Lykins, Button, Krietemeyer, Sauer, Walsh, Duggan & Williams 2008; Baer, Samuel & Lykins 2011).

To address cooperation, a conflict-resolution instrument, known as the Thomas-Kilmann Conflict Mode Instrument (TKI), would be suitable as it has been refined over 40 years to reduce social desirability bias (Kilmann & Thomas 1977).

This instrument is designed to differentiate between specific intentions for handling conflict, and identifies the following five main modes of resolution:

- competing;
- accommodating;
- avoiding;
- collaborating; and
- compromising.

These five modes are defined according to two basic behavioural dimensions of assertiveness and cooperativeness (Kilmann & Thomas 1975; Thomas & Kilmann 1978). The general transformational context refers to the measurement of overall tendency towards mindfulness disposition (FFMQ), and of overall tendency towards either assertiveness or cooperativeness in conflict situations (TKI). Assertiveness is understood as an attempt to satisfy one's own concerns via a more egocentric approach, whilst cooperativeness is understood as an attempt to satisfy others' concerns via a more eco-centric approach (TKI). It would be reasonable to assert that a tendency towards cooperation would be a more desired approach in a collaborative design endeavour.

Transformation can also be measured in the context of discrete or individual facets of mindfulness, and of modes of conflict-resolution. Potential correlations can then be drawn upon the measured results of individual facets and modes as described, to enable conclusions specific to the relationships between discrete elements representing tendencies towards mindful awareness and towards behaviour in situations of conflict.

C.3 Most Influential Emerging Values

Below is a general quantitative overview of the value categories as they emerged in order of frequency. Although the size of the data set is not suitable for statistically significant quantitative analysis, a broad view of the frequency of the emerging categories may serve as a base for future research. Figures 6 and 7 illustrate the frequency in which specific value categories emerged as meaningful.

The ranges appear to suggest that, in the context of collaborative design, *Efficacy* and *Relationality* values emerge as meaningful significantly more often. Thus, they arguably constitute the source of most impacting values into design decisions in the context of collaborative design. According to this apparent inclination it can reasonably be suggested that, for designers in a collaboration setting, attributes are most important which:

- promote competencies that are geared towards efficiency and results;
- promote harmony, consensus or rapport in interpersonal relationships.

To be effective and/or efficient, and to display cooperative qualities in settings where collaboration is needed, appear to be crucial motivators impacting design decisions. Further research can apply the *mindful design device*, and the data collection and analysis methodology presented in this thesis to a larger group to include statistically significant measures that can potentially clarify whether these tendencies persist.

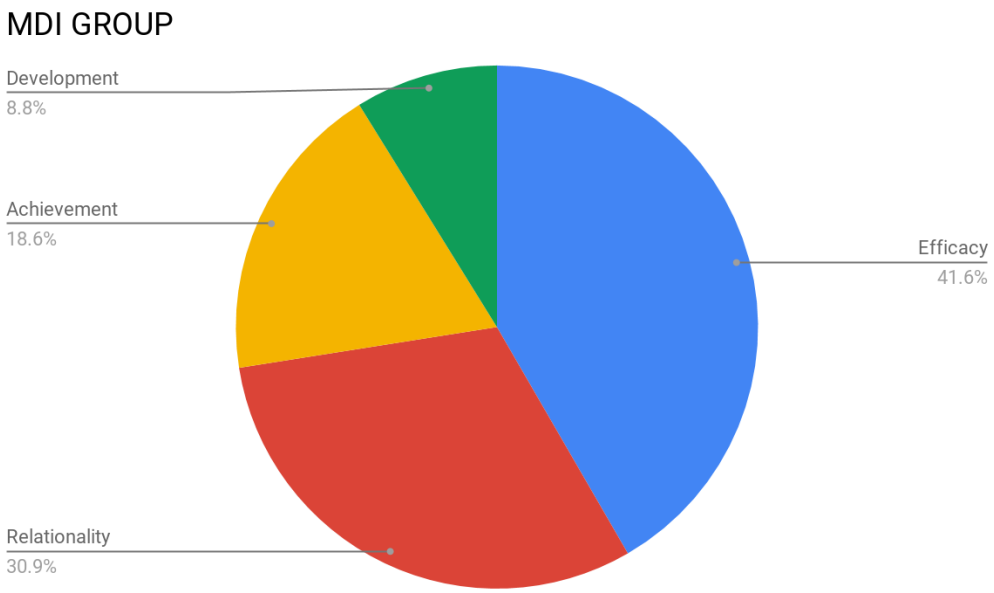


Figure 6. Frequency of MDI Group Value Categories

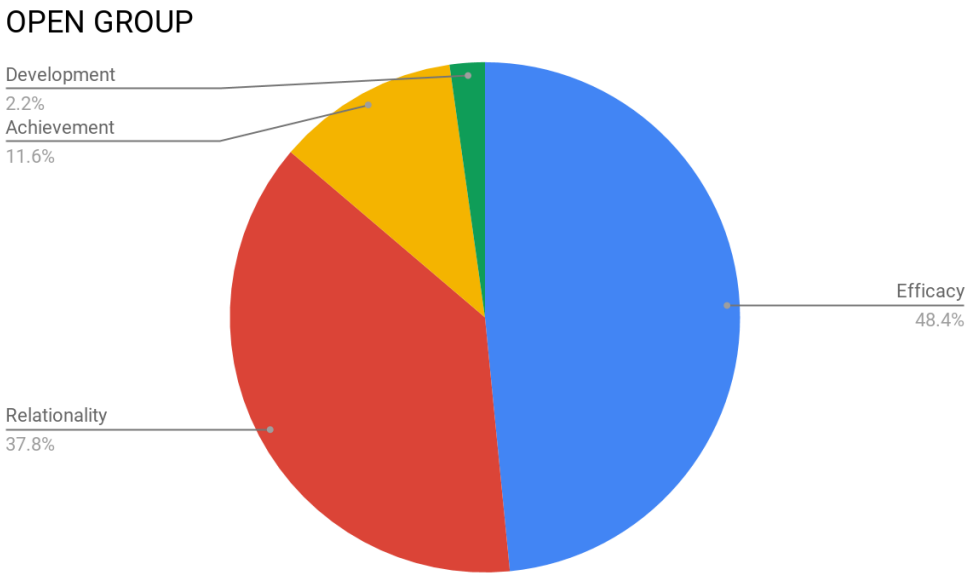


Figure 7. Frequency of Open Group Value Categories

C.4 Effects of Commitment to a Mindfulness Practise

A potential claim specific to the relation between the commitment to mindfulness practise and its effects can potentially be explored in a future quantitative study. This researcher developed an interest in assessing whether transformation of values was evidenced during the study period. In other words, did the frequency of specific emerging value categories change over the course of the practise span? If it did, it could've been initial evidence of mindfulness practise transforming the kinds of meaningful values that arise overtime, and thus a topic for further research.

An overview of the data appears to suggest that the categories of values that emerge tend to stay in the same general frequency level throughout the study period. There does not appear to be a change as a consequence of the practise. Yet, there appears to be a significant difference in the frequency of certain categories of values emerging that correlates with the level of engagement of the participant over the practise span.

For example, values in the category of Relationality[1] emerged significantly less, in relation to the other value categories, in sets of participants that had a lesser (Figure 8. Modest Engagement) commitment to the practise than those who sustained a full commitment (Figure 9. Maximal Engagement) to the suggested level of engagement with the *mindful design device*.

[1] Understood in this study as a personal or professional quality promoting harmonious or cooperative interactions in human relationships

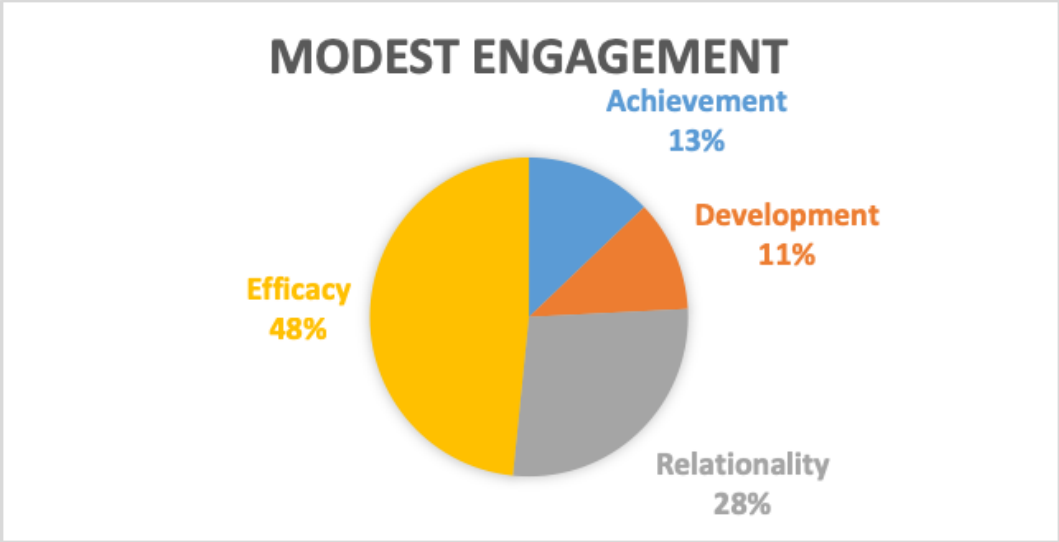


Figure 8. Frequency of Modest Engagement Value Categories. Equivalent to approximately once every three days during the practise span.

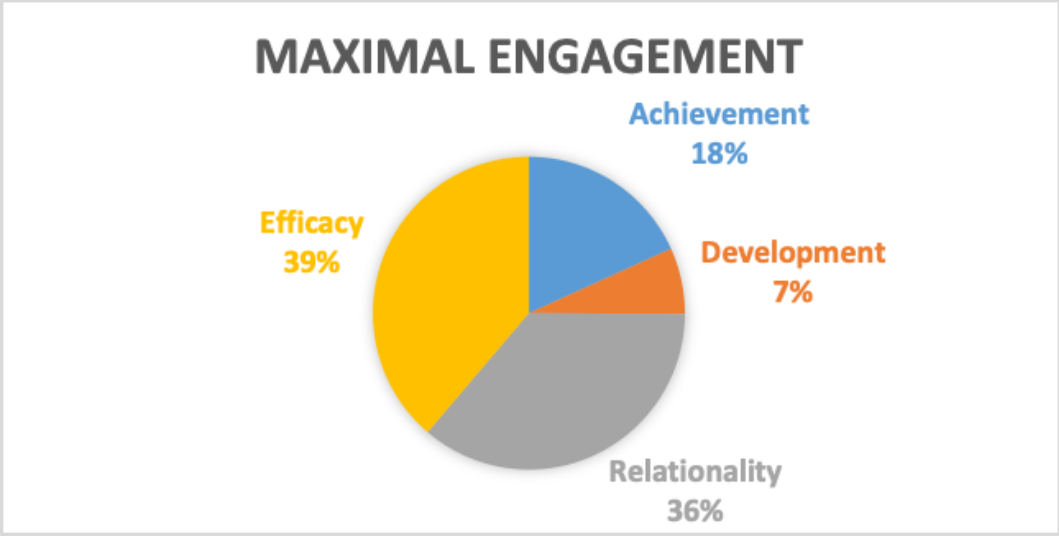


Figure 9. Frequency of Maximal Engagement Value Categories: Equivalent to at least once or more per day during the practise span.

If this is confirmed in future quantitative studies with statistically adequate samples, a potential claim could be made that the initial and sustained commitment to the mindfulness practise has immediate impact on categories of values that emerge during practise. And if *Relationality* is confirmed as one of such categories of values, it could suggest that the level of commitment to the practise, has a direct effect in the category of values that emerge which have to do with the quality of interpersonal relationships. This is directly relevant to collaborative design concerns.

Appendix D
DATA PRESENTATION FOR RQ3

Contents

D.1 Introduction

This Appendix contains the full extent of the data pertaining to Research Question RQ3:

> *'What kinds of personal and professional values arise upon mindful reflection in context with collaboration-based Design?'*

In order to present it in an organised manner, it was arranged around the major values and roles categories emerging from the analysis.

The four major value categories[1] are:

- Efficacy: Personal or professional quality promoting the ability to produce a desired or intended result.
- Relationality: Personal or professional quality promoting harmonious or cooperative interactions in human relationships.
- Development: Desire for personal or professional continued learning or knowledge acquisition.
- Achievement: Desire for personal or professional success.

[1] To aid in clarity, the categories have been highlighted in individual colors and a legend was included in all of this chapter's pages.

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

The six major role categories are:

- Designer: Role as collaboration-based Design academic.
- Non-Design Professional: Role as a professional in a field other than Design. (i.e. Filmmaker, Entrepreneur, Language Tutor).
- Personal Relational: Role within close personal relationships. (i.e. Sister, Girlfriend, Husband, Granddaughter).
- Personal Skill/Hobby: Role within leisure activities. (i.e. Runner, Knitter, Gamer).
- Personal Individual/Reflective: Abstract introspective roles. (i.e. Person, Me, Mental-self, Individual).
- Student: Role within graduate Design student general academic experience.

For additional clarity and manageability, value categories are subdivided as ‘personal’ and ‘professional’, and within each value category, they are further separated by role category. Within each table, the submissions that belong to the MDI Group or to the OPEN Group, are identified accordingly.

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

D.2 Efficacy | Personal

Personal Efficacy: Understood as a personal quality promoting the ability to produce a desired or intended result.

Table 18. Data Presentation for RQ3 - Personal Efficacy

ROLE CATEGORY: **PERSONAL INDIVIDUAL/REFLECTIVE**

MDI GROUP - SELF	MDI GROUP - VALUE
Adult Self	Productivity
Adult Self	Productivity
Dreamer	Imagination
Adult Self	Energy
Human Self	Equanimity (Shock)
Individual	Positivism
Individual	Excitement
Individual	Gratefulness
Human Self	Aliveness
Adult Self	Balance
Adult Self	Determination
Diabetic	Self-care
Diabetic	Self-care
Individual	Rest
Diabetic	Self-care
Individual	Patience

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Diabetic	Discipline
Healthy Self	Discipline
Lazy-Self	Self-worth (Pathetic)
Healthy Self	Energy
Healthy Self	Energy
Self-organizer	Inner Harmony
Person	Inner Harmony
Individual	Motivation
Planning-self	Timeliness
Resting-self	Discipline
Healthy Self	Balance
Person	Pride
Person	Adaptability
Person	Discipline
Healthy Self	Calm
Healthy Self	Perseverance
Person	Balance
Person	Openness
Person	Letting go
Person	Confidence
Healthy Self	Calm
Healthy Self	Confidence
Healthy Self	Robustness
Person	Time-management
Healthy Self	Pace
Healthy Self	Pace
Healthy Self	Optimism
Financial-self	Discipline

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

OPEN GROUP - SELF	OPEN GROUP - VALUE
Citizen	Responsibility
Myself	Effort
Consumer	Awareness
Observer	Discipline
Citizen of Earth	Perception
Human	Wisdom

ROLE CATEGORY: **PERSONAL SKILL/HOBBY**

MDI GROUP - SELF	MDI GROUP - VALUE
Fitness	Self-esteem
Fitness	Commitment
Runner	Commitment
Athlete	Professionalism
Runner	Motivation
Knitter	Balance
Cook	Balance
Traveler	Passion
Tourist	Fun
Gym-self	Discipline
Gym-self	Discipline

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Gym-self	Discipline
Traveler	Balance
Gym-self	Discipline
Poker-self	Fun
Runner	Discipline
Exercising-self	Passion
Reading-self	Focus
Musical-self	Discipline
Runner	Discipline
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Dance Student	Carelessness
Dancer	Permeability
Volunteer	Permeability
Volunteer	Humility
Dancer	Commitment - Skill
Dancer	Fearlessness
Dancer	Self-esteem
Dancer	Rigour
Traveller	Organisation
Dancer	Perseverance
Passenger	Patience
Runner	Laziness

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

ROLE CATEGORY: **STUDENT**	
MDI GROUP - SELF	**MDI GROUP - VALUE**
Student	Personal Philosophies
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
(none)	

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

D.3 Efficacy | Professional

Professional Efficacy: Understood as a professional quality promoting the ability to produce a desired or intended result.

Table 19. Data Presentation for RQ3 - Professional Efficacy

ROLE CATEGORY: **DESIGN TEAM MEMBER**

MDI GROUP - SELF	MDI GROUP - VALUE
MDI Team Member	Timeliness
MDI Team Member	Ambition
MDI Team Member	Dedication
MDI Team Member	Productivity
MDI Team Member	Productivity
MDI Team Member	Efficiency
MDI Team Member	Quality
MDI Team Member	Competence
MDI Team Member	Effectiveness
MDI Team Member	Decisiveness
MDI Team Member	Efficiency
MDI Team Member	Timeliness
MDI Team Member	Dedication
MDI Team Member	Motivation
MDI Team Member	Motivation

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

MDI Team Member	Responsibility
MDI Team Member	Creativity
MDI Team Member	Optimism
MDI Team Member	Curiosity
MDI Team Member	Productivity
MDI Team Member	Leadership
MDI Team Member	Reflectiveness
MDI Team Member	Decisiveness
MDI Team Member	Responsibility
MDI Team Member	Initiative
MDI Team Member	Productivity
MDI Team Member	Productivity
MDI Team Member	Quality
MDI Team Member	Professionalism
MDI Team Member	Quality
MDI Team Member	Creativity
MDI Team Member	Curiosity
MDI Team Member	Responsibility
MDI Team Member	Organization
MDI Team Member	Decisiveness
MDI Team Member	Analysis
MDI Team Member	Determination
MDI Team Member	Organization
MDI Team Member	Discipline
MDI Team Member	Organization
MDI Team Member	Clarity
MDI Team Member	Motivation
MDI Team Member	Discipline

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

MDI Team Member	Clarity
MDI Team Member	Time Management
MDI Team Member	Timeliness
MDI Team Member	Discipline
MDI Team Member	Timeliness
MDI Team Member	Stepping back
MDI Team Member	Curiosity
MDI Team Member	Faith
MDI Team Member	Responsibility
MDI Team Member	Risk-taking
MDI Team Member	Curiosity
MDI Team Member	Responsibility
MDI Team Member	Stresslessness
MDI Team Member	Responsibility
MDI Team Member	Timeliness
MDI Team Member	Preparation
MDI Team Member	Perseverance
MDI Team Member	Alertness
MDI Team Member	Interest
MDI Team Member	Discipline
MDI Team Member	Organization
MDI Team Member	Creativity
MDI Team Member	Discipline
MDI Team Member	Balance
MDI Team Member	Timeliness
MDI Team Member	Quality
MDI Team Member	Discipline
MDI Team Member	Efficiency

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

MDI Team Member	Self-esteem
MDI Team Member	Individuality
MDI Team Member	Work-life balance
MDI Team Member	Discipline
MDI Team Member	Positive Attitude
MDI Team Member	Efficiency
MDI Team Member	Efficiency
MDI Team Member	Timeliness
MDI Team Member	Positive Attitude
MDI Team Member	Motivation
MDI Team Member	Order
MDI Team Member	Productivity
MDI Team Member	Focus
MDI Team Member	Efficiency
MDI Team Member	Focus
MDI Team Member	Fun
MDI Team Member	Dedication
MDI Team Member	Dedication
MDI Team Member	Dedication
MDI Team Member	Determination
MDI Team Member	Reflectiveness
MDI Team Member	Balance
MDI Team Member	Dedication
MDI Team Member	Poise
MDI Team Member	Simplicity
MDI Team Member	Dedication
MDI Team Member	Confidence
MDI Team Member	Confidence

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Innovator	Faith
MDI Team Member	Inspiration
MDI Team Member	Faith
MDI Team Member	Perseverance
MDI Team Member	Balance
MDI Team Member	Observance
MDI Team Member	Responsibility
MDI Team Member	Robustness
MDI Team Member	Responsibility
MDI Team Member	Encouragement
MDI Team Member	Competitiveness
MDI Team Member	Competitiveness
MDI Team Member	Creativity
MDI Team Member	Curiosity
MDI Team Member	Decisiveness
MDI Team Member	Timeliness
MDI Team Member	Timeliness
MDI Team Member	Creativity
MDI Team Member	Leadership
MDI Team Member	Courage
MDI Team Member	Timeliness
MDI Team Member	Positive Attitude
MDI Team Member	Leadership
MDI Team Member	Equanimity (Concern)
MDI Team Member	Competency
MDI Team Member	Discipline
MDI Team Member	Discipline
MDI Team Member	Timeliness

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

MDI Team Member	Discipline
MDI Team Member	Observance
MDI Team Member	Analysis
MDI Team Member	Reflectiveness
MDI Team Member	Organization
MDI Team Member	Reconsidering
MDI Team Member	Determination
MDI Team Member	Reflectiveness
MDI Team Member	Perseverance
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Designer	Uniqueness
Designer	Boldness
Designer	Foresight
Designer	Multitasking
Designer	Urgency
Designer	Proactiveness
Designer	Accuracy
Designer	Imaginative
Teacher	Timeliness
Designer	Excitement
Supervisor	Precision
Designer	Balance
Designer	Humility
Teacher	Willpower
Designer	Urgency
Designer	Comprehensiveness
Designer	Concentration

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

Designer	Humility
Designer	Accuracy
Designer	Dedication
Designer	Rigour
Designer	Boldness
Designer	Elegance
Designer	Professionalism
Designer	Efficiency
Designer	Efficiency
Designer	Order
Designer	Clarity
Employee	Detachment
Designer	Compliance
Employee	Rigour
Designer	Focus
Designer	Timeliness
Designer	Modesty
Designer	Organisation
Designer	Rigour
Designer	Rigour
Designer	Rigour
Designer	Organisation
Designer	Cheerfulness
Colleague	Humility
Designer	Rigour
Designer	Originality
Designer	Leadership
Course Coordinator	Leadership

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Designer	Creative
Instructor	Engaging
Designer	Inspiring
Designer	Fun
Designer	Engaging
Designer	Analytical
Designer	Clarity
Designer	Love - Skill
Designer	Creative
Designer	Analytical
Designer	Responsibility
Designer	Balance
Designer	Expertise
Designer	Values
Designer	Ethical
Employee	Responsibility
Designer	Citizenship
Designer	Integrity
Designer	Imaginative
Designer	Autonomy
Designer	Awareness
Designer	Awareness
Designer	Sensibility
Assistant	Organisation
Designer	Responsibility
Designer	Displacement
Designer	Balance
Designer	Competency

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Designer	Higher Perspective
Designer	Discipline
Designer	Insecurity
Designer	Balance
Designer	Passion
Designer	Higher Perspective
Designer	Courage

ROLE CATEGORY: **NON-DESIGN PROFESSIONAL**

MDI GROUP - SELF	**MDI GROUP - VALUE**
Hockey Coach	Motivation
Hockey Coach	Hopefulness
Hockey Coach	Control (Leadership)
Hockey Coach	Integrity
Filmmaker	Professionalism
Filmmaker	Organization
Filmmaker	Professionalism
Filmmaker	Organization
Filmmaker	Timekeeping
Language Tutor	Self-respect
Employee	Motivation
Employee	Organization

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

Business-self	Dedication
Working-self	Productivity
Employee	Positive attitude (uncertainty)
Employee	Positive attitude (uncertainty)
Business-self	Organization
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Hairdresser	Autonomy

ROLE CATEGORY: **STUDENT**

MDI GROUP - SELF	**MDI GROUP - VALUE**
Student	Reflectiveness
Student	Diligence
Student	Dedication
Student	Discipline
Student	Confidence
Student	Ambition
Student	Realism
Student	Attention to Detail
Student	Compliance
Student	Perseverance
Student	Discipline
Student	Balance

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

Student	Grit
Student	Faith
Student	Pace
Student	Timing
Student	Passion
Student	Equanimity (Nervousness)
Student	Equanimity (Nervousness)
Student	Focus
Student	Concentration
Student	Timeliness
Student	Hard-work
Student	Hard-work
Student	Compliance
Student	Equanimity (Stressfulness)
Student	Timeliness (non)
Student	Busyness
Student	Clarity
Student	Hard-work
Student	Motivation
Student	Timeliness
Student	Responsibility
Student	Determination
Student	Productivity
Student	Timeliness
Student	Capabilities
Student	Capabilities
Student	Timeliness
Student	Discipline

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Student	Reflectiveness
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Student	Determination
Student	Discipline
Student	Perseverance
Student	Perseverance
Student	Resiliency
Student	Dedication
Student	Creative
Student	Dedication
Student	Discipline
Student	Patience

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

D.4 Relationality | Personal

Personal Relationality: Understood as a personal quality promoting harmonious or cooperative interactions in human relationships.

Table 20. Data Presentation for RQ3 - Personal Relationality

ROLE CATEGORY: **PERSONAL INDIVIDUAL/REFLECTIVE**

MDI GROUP - SELF	**MDI GROUP - VALUE**
Listener Healthy Self Child-self	Sharing Listening Family (Homesickness)
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Citizen Citizen	Fairness Connectedness

ROLE CATEGORY: **PERSONAL SKILL/HOBBY**

MDI GROUP - SELF	**MDI GROUP - VALUE**

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Walker	Connectedness
Traveler	Openness
Football-self	Teamwork
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Volunteer	Respect
Traveller	Sensitivity
Dancer	Openness

ROLE CATEGORY: **PERSONAL RELATIONAL**

MDI GROUP - SELF	**MDI GROUP - VALUE**
Girlfriend	Balance
Girlfriend	Relationship
Friend	Communication
Friend	Understanding
Daughter	Loving
Daughter	Caring
Friend	Openness
Family Member	Balance
Girlfriend	Happiness
Daughter	Connectedness
Sister	Compassion
Sister	Understanding

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

Granddaughter	Sanctuary
Family Member	Support
Family Member	Treasuring
Husband	Commitment
Brother	Accountability
Husband	Openness
Husband	Resolve
Husband	Partnership
Brother	Resolve
Family Member	Excitement
Family Member	Nirvana
Family Member	Loving
Family Member	Family
Family Member	Friendship
Husband	Positivism
Socializer	Communication
Partner	Communication
Granddaughter	Communication
Roommate	Communication
Boyfriend	Faith
Boyfriend	Faith
Friend	Communication
Boyfriend	Strength
Friend	Honesty
Friend	Engagement
Family Member	Power
Family Member	Happiness
Daughter	Responsibility

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

Friend	Influence
Daughter	Filial Piety
Friend	Timeliness
Friend	Caring
Friend	Caring
Cousin	Dependability
Friend	Balance
Friend	Caring
Friend	Joy
Friend	Bonding
Friend	Timeliness
Friend	Caring
Friend	Enjoyment
Friend	Timeliness
Family Member	Honor
Family Member	Gratitude
Friend	Caring
Resident / Neighbor	Silence
Friend	Recognition
Friend	Friendship
Friend	Fun
Family Member	Gratitude
Family Member	Support
Friend	Appreciation
Friend	Gratitude
Friend	Fun
Friend	Fun
Friend	Caring

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Resident / Neighbor	Caring
Friend	Balance
Resident / Neighbor	Caring
Resident / Neighbor	Support
Family Member	Balance
Socializer	Confidence
Friend	Non (Judgement)
Friend	Gut feeling
Friend	Clarity
Friend	Closeness (Distance)
Friend	Gratitude
Friend	Reciprocation
Friend	Identity
Friend	Self-esteem
Friend	Balance
Friend	Supportiveness
Social-self	Enjoyment
Daughter	Communication
Friend	Involvement
Daughter	Family
Friend	Friendship
Friend	Friendship
Friend	Trustworthiness
Boyfriend	Loving
Boyfriend	Responsibility
Son	Kindness
Son	Kindness
Friend	Happiness

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Son	Communication
Friend	Communication
Son	Homesickness
Son	Finances
Son	Closeness (Distance)
Son	Finances
Friend	Helpfulness
Son	(In) Dependence
Friend	Relationship
Son	Expectation
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Partner	Fairness
Cousin	Honesty
Volunteer	Attentiveness
Friend	Presence
Friend	Appreciation
Sister	Focus
Partner	Attention
Friend	Compassion
Daughter	Attentiveness
Friend	Awareness
Friend	Compassion
Cousin	Openness
Sister	Reciprocity
Partner	Attentiveness
Partner	Efficiency - interpersonal
Partner	Fitness - interpersonal

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

Partner	Fairness
Mother	Love
Mother	Protection
Friend	Trustworthy
Friend	Openhearted
Parent	Responsiveness
Parent	Tolerance
Parent	Tolerance
Parent	Strong
Woman	Embracing
Daughter	Affection
Sister in Law	Affection
Friend	Loyalty
Family	Safety
Sister	Connectedness
Neighbour	Collaboration
Daughter	Autonomy
Wife/Girlfriend	Independence
Friend	Love
Friend	Loyalty
Parent	Responsibility
Friend	Self-awareness
Parent	Appreciation
Parent	Kindness
Parent	Presence

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

D.5 Relationality | Professional

Professional Relationality: Understood as a professional quality promoting harmonious or cooperative interactions in human relationships.

Table 21. Data Presentation for RQ3 - Professional Relationality

ROLE CATEGORY: **DESIGN TEAM MEMBER**

MDI GROUP - SELF	**MDI GROUP - VALUE**
MDI Team Member	Collaboration
MDI Team Member	Honesty
MDI Team Member	Collaboration
MDI Team Member	Teamwork
MDI Team Member	Collaboration
MDI Team Member	Collaboration
MDI Team Member	Cooperation
MDI Team Member	Involvement
MDI Team Member	Trust
MDI Team Member	Involvement
MDI Team Member	Responsiveness
MDI Team Member	Responsiveness
MDI Team Member	Acceptance
MDI Team Member	Sharing

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

MDI Team Member	Coordination
MDI Team Member	Patience
MDI Team Member	Communication
MDI Team Member	Communication
MDI Team Member	Understanding
MDI Team Member	Openness
MDI Team Member	Harmony
MDI Team Member	Collaboration
MDI Team Member	Communication
MDI Team Member	Respect
MDI Team Member	Respect
MDI Team Member	Engagement
MDI Team Member	Bonding
MDI Team Member	Understanding
MDI Team Member	Connectedness
MDI Team Member	Involvement
MDI Team Member	Integration
MDI Team Member	Teamwork
MDI Team Member	Teamwork
MDI Team Member	Support
MDI Team Member	Teamwork
MDI Team Member	Integration
MDI Team Member	Support
MDI Team Member	Consideration
MDI Team Member	Patience
MDI Team Member	Vulnerability
MDI Team Member	Openness
MDI Team Member	Openness

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

MDI Team Member	Gratitude
MDI Team Member	Forgiveness
MDI Team Member	Reliability
MDI Team Member	Resilience
MDI Team Member	Trustworthiness
MDI Team Member	Patience
MDI Team Member	Listening
MDI Team Member	Tolerance
MDI Team Member	Trust
MDI Team Member	Delegating
MDI Team Member	Restraint
MDI Team Member	Calm
MDI Team Member	Helpfulness (non)
MDI Team Member	Connectedness
MDI Team Member	Friendship
MDI Team Member	Solidarity
MDI Team Member	Friendship
MDI Team Member	Friendship
MDI Team Member	Friendship
MDI Team Member	Teamwork
MDI Team Member	Inclusion
MDI Team Member	(un) bias
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Designer	Accountability
Co-worker	Caring
Designer	Respectfulness
Designer	Honesty

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

Designer	Authenticity
Co-worker	Openness
Co-worker	Openness
Ex-coworker	Availability
Co-worker	Understanding
Project Manager	Credibility
Applicant	Honesty
Designer	Availability
Ex-coworker	Appreciation
Designer	Empathy
Instructor	Open
Instructor	Embracing
Designer	Inclusive
Designer	Collaboration
Designer	Cooperation
Designer	Embracing
Designer	Embracing
Designer	Understanding
Designer	Trust
Designer	Sharing
Designer	Trust
Designer	Collaboration
Designer	Kindness
Colleague	Cooperation
Designer	Empathy
Designer	Empathy
Colleague	Collaboration
Designer	Connectedness

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

Teacher	Teamwork
Designer	Trustworthy
Designer	Understanding
Designer	Trust
Colleague	Authenticity
Designer	Boundaries

ROLE CATEGORY: **NON-DESIGN PROFESSIONAL**

MDI GROUP - SELF	**MDI GROUP - VALUE**
Hockey Coach	Teamwork
Language Tutor	Sharing
Language Tutor	Openness (Hiding feelings)
Networker	Connectedness
Business-self	Loyalty
Leader-self	Patience
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
(none)	

ROLE CATEGORY: **STUDENT**

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

MDI GROUP - SELF	MDI GROUP - VALUE
Student	Friendship
Student	Adaptability
Student	Perspective
Student	Calm
Student	Calm
Student	Patience
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Student	Cooperation

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

D.6 Achievement | Personal

Personal Achievement: Understood as a desire for personal success.

Table 22. Data Presentation for RQ3 - Personal Achievement

ROLE CATEGORY: **PERSONAL INDIVIDUAL/REFLECTIVE**

MDI GROUP - SELF	MDI GROUP - VALUE
Adult Self	Health
Individual	Health
Adult Self	Health
Individual	Health
Adult Self	Money
Individual	Wellbeing
Mental Self	Happiness
Me	Pleasure
Resting-self	Peace
Relaxing-self	Peace
Resting-self	Peace
Resting-self	Peace
Healthy Self	Self-care
Person	Looking forward
Clean-self	Purity
Sleeping-self	Dreaming
Ideation-self	Dreaming

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Healthy Self	Fitness
Healthy Self	Fitness
Healthy Self	Fitness
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Myself	Freedom
Meditator	Clarity
Myself	Relaxation
Myself	Love
Myself	Homecoming
Woman	Sacred feminism
Client	Pleasure
Human Being	Truth
Human	Connectedness
Human Being	Meaningfulness
Citizen	Participation

ROLE CATEGORY: **PERSONAL RELATIONAL**

MDI GROUP - SELF	**MDI GROUP - VALUE**
Husband	Healing
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
(none)	

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

ROLE CATEGORY: **PERSONAL SKILL/HOBBY**

MDI GROUP - SELF	MDI GROUP - VALUE
Runner	Advancement
Fitness	Health
Fitness	Wellness
Fitness	Balance
Runner	Achievement
Runner	Achievement
Runner	Advancement
Runner	Advancement
Fitness	Enhancement
Hockey Player	Health
Athlete	Wealth
Knitter	Accomplishment
Knitter	Joy
Cook	Pleasure
Traveler	Happiness
Fitness-self	Happiness
Sports-self	Advancement
Music listener	Relaxation
Gamer	Freedom
Jogging-self	Peace
Gamer	Peace
Traveler	Self-discovery

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

Reading-self	Worth
Reading-self	Worth
Writing-self	Progress
Cook	Service
Independent-self	Finances
Hobby-self	Investment
Guitar-self	Unwinding
Football-self	Recovery
Football-self	Recovery
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Runner	Stability

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

D.7 Achievement | Professional

Professional Achievement: Understood as a desire for professional success.

Table 23. Data Presentation for RQ3 - Professional Achievement

ROLE CATEGORY: **DESIGN TEAM MEMBER**

MDI GROUP - SELF	MDI GROUP - VALUE
MDI Team Member	Achievement
MDI Team Member	Achievement
MDI Team Member	Accomplishment
MDI Team Member	Achievement
MDI Team Member	Achievement
MDI Team Member	Achievement
MDI Team Member	Aspiration
MDI Team Member	Achievement
MDI Team Member	Accomplishment
MDI Team Member	Accomplishment
MDI Team Member	Money
MDI Team Member	Success
MDI Team Member	Achievement
MDI Team Member	Innovation
MDI Team Member	Completeness
MDI Team Member	Accomplishment

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

MDI Team Member	Completion
MDI Team Member	Completion
MDI Team Member	Meaningful work
MDI Team Member	Meaningful work
MDI Team Member	Success
MDI Team Member	Accomplishment
MDI Team Member	Security
MDI Team Member	Success
MDI Team Member	Contribution
MDI Team Member	Achievement
MDI Team Member	Recognition
MDI Team Member	Recognition
MDI Team Member	Progress
MDI Team Member	Achievement
MDI Team Member	Progression
MDI Team Member	Progress
MDI Team Member	Contribution
MDI Team Member	Security
MDI Team Member	Contribution
MDI Team Member	Innovation
MDI Team Member	Peace
MDI Team Member	Stability
MDI Team Member	Pride
MDI Team Member	Contribution
MDI Team Member	Meaningful work
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Designer	Relaxation

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

Designer	Letting go
Designer	Brilliancy
Designer	Enjoyment
Designer	Unwinding
Designer	Completion
Designer	Freedom
Designer	Freedom
Designer	Equality
Designer	Calmness
Designer	Challenge
Designer	Health
Designer	Meaningful Work
Designer	Achievement

ROLE CATEGORY: **NON-DESIGN PROFESSIONAL**

MDI GROUP - SELF	**MDI GROUP - VALUE**
Hockey Coach	Relief
Freelancer	Achievement
Language Tutor	Achievement
Language Tutor	Meaningful work
Job applicant	Pleasure
Job applicant	Meaningful work
Finance student	Completion

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

Working-self Entrepreneur Employee	Value Innovation (In)stability
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
(none)	

ROLE CATEGORY: **STUDENT**

MDI GROUP - SELF	**MDI GROUP - VALUE**
Student	Achievement
Student	Peace
Student	Self-care
Student	Achievement
Student	Improvement
Student	Forward moving (Stuck)
Student	Achievement
Student	Success
Student	Finances
Student	Finances
Student	Finances
Student	Finances
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
(none)	

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

D.8 Development | Personal

Personal Development: Understood as a desire for personal continued learning or knowledge acquisition.

Table 24. Data Presentation for RQ3 - Personal Development

ROLE CATEGORY: **PERSONAL INDIVIDUAL/REFLECTIVE**

MDI GROUP - SELF	**MDI GROUP - VALUE**
Reflective person Person Healthy Self	Learning Learning Preservation
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
(none)	

ROLE CATEGORY: **PERSONAL SKILL/HOBBY**

MDI GROUP - SELF	**MDI GROUP - VALUE**
Runner Fitness	Growth Challenge

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

Fitness	Change
Fitness	Improvement
Fitness	Development
Traveler	Exploration
Explorer	Knowledge
Traveler	Planning
Holiday-planner	Scoping
Runner	Preparation
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
(none)	

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

D.9 Development | Professional

Professional Development: Understood as a desire for professional continued learning or knowledge acquisition.

Table 25. Data Presentation for RQ3 - Professional Development

ROLE CATEGORY: **DESIGN TEAM MEMBER**

MDI GROUP - SELF	MDI GROUP - VALUE
MDI Team Member	Development
MDI Team Member	Development
MDI Team Member	Development
MDI Team Member	Development
MDI Team Member	Development
MDI Team Member	Development
MDI Team Member	Challenge
MDI Team Member	Change
MDI Team Member	Education
MDI Team Member	Experimenting
MDI Team Member	Change
MDI Team Member	Learning
MDI Team Member	Exploration
MDI Team Member	Knowledge
MDI Team Member	Knowledge
MDI Team Member	Challenge

Value Categories Color Legend

EFFICACY	RELATIONALITY	ACHIEVEMENT	DEVELOPMENT

MDI Team Member	Challenge
MDI Team Member	Growth
MDI Team Member	Development
MDI Team Member	Challenge
MDI Team Member	Learning
MDI Team Member	Learning
MDI Team Member	Growth
MDI Team Member	Knowledge
MDI Team Member	Knowledge
MDI Team Member	Learning
MDI Team Member	Learning
MDI Team Member	Knowledge
MDI Team Member	Development
MDI Team Member	Development
MDI Team Member	Learning
MDI Team Member	Education
MDI Team Member	Planning
MDI Team Member	Teaching
MDI Team Member	Knowledge
MDI Team Member	Challenge
MDI Team Member	Knowledge
MDI Team Member	Research
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
Designer	Challenge
Designer	Learning
Designer	Learning

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

Designer	Learning
Designer	Challenge

ROLE CATEGORY: **NON-DESIGN PROFESSIONAL**

MDI GROUP - SELF	**MDI GROUP - VALUE**
Hockey Coach Language Tutor	Challenge Growth
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
(none)	

ROLE CATEGORY: **STUDENT**

SELF	**VALUE**
English Language Student Student	Learning Self-learning
OPEN GROUP - SELF	**OPEN GROUP - VALUE**
(none)	

Value Categories Color Legend

EFFICACY	**RELATIONALITY**	**ACHIEVEMENT**	**DEVELOPMENT**

Appendix E
DATA PRESENTATION FOR RQ4

Contents

4.1 Introduction

This Appendix contains the full extent of the data pertaining to Research Question RQ4:

> *'Does engagement with the mindful design device have an enhancing effect on designers' interpersonal relationships?'*

A conjecture was elaborated to test against participants' final reflections upon the experience of engagement with the *mindful design device*:

> *Conjecture:* ***Upon engagement with a mindful design device, designers will recognize improvements in their interpersonal relationships.***

The sections in this Appendix will display the data pertinent to the conjecture organised around three categories of statements:

- **Category 1**: Supporting the conjecture and supporting other Mindfulness benefits.
- **Category 2**: Refuting the conjecture and supporting other Mindfulness benefits.
- **Category 3**: Supporting other Mindfulness benefits.

Besides reflecting on the effect in interpersonal relationships, and possibly because of the open-endedness of the question, participants chose to also share effects about their experience and perceived effects with the *mindful design device* that were not specific to interpersonal relationships.

The analysis of the data showed that, although many of the participants did, not everyone perceived or chose to share improvements specific to their interpersonal relationships only, or at all. In fact, many of the

participants chose to either include or only share other effects not specific to interpersonal relationships although potentially having an influence on relational contexts. Thus, the data showed other complementary components to mindful reflection effects in this context that were not described in the conjecture.

From the critical analysis of the new data-driven information, a final conjecture statement was constructed to embody the new categories of suggested mindfulness effects:

> ***Upon engagement with a mindful design device, designers can experience Mindfulness benefits by becoming more aware of intrapersonal and interpersonal aspects; and by becoming more aware of the impact of self-awareness on intrapersonal and interpersonal aspects.***

From the analysis it was concluded that increased awareness is evidenced for each interpersonal and intrapersonal dimension in specific ways. All statements were coded and analysed by line to develop themes and draw conclusions. Statements were assigned letter-number codes to represent the participant group[1] (MDI; OPEN), and theme notes are in italics and in parentheses containing the related code of the supported mindfulness benefits found in Chapter 5.

[1] See Section 3.8 for participants' information.

E.2 Category 1

Table 26. Data Presentation for RQ4 - Category 1

Statements supporting the conjecture and other Mindfulness benefits

MDI-1A

LINE-1A1
Maybe became more aware of how my personal outlook was integrated with/ completely often relied upon my relationships with others, focusing on the importance of these relationships more.

(Becoming more aware of the impact relationships have on personal outlook; supporting Mindfulness benefits: M19; M24; M26; M31; M32; M34)

MDI-1B

LINE-1B1
I feel I have become more aware of my surroundings and how people are feeling on particular days.

(becoming more aware of others' states of being; supporting Mindfulness benefits: M19; M24; M26; M31)

LINE-1B2
I have then taken this into consideration when working on project work.

(bringing improved awareness of others into work contexts; supporting Mindfulness benefit: M25; M31)

MDI-1C

LINE-1C1

I feel as though it has made me more aware about how I am feeling, i.e. Acknowledging when and why I am stressed.

(becoming more aware of inner emotions; supporting Mindfulness benefit: M24; M32)

LINE-1C2
Through understanding my stresses I believe it had helped me to remain more balanced, imposing my engagement and energy with my peers.

(connecting self-awareness with improved interpersonal relationships; supporting Mindfulness benefits: M24; M26; M31; M34)

MDI-1D

LINE-1D1
Everyone has their own personality, working style, and so on, but everyone is an important member of the Multidisciplinary team.

(validating the team value and uniqueness in others: supporting Mindfulness benefits: M24; M25; M26; M31)

LINE1D2
When I was doing this activity I reflected on myself and there were many factors to think with regards to why something has happened.

(connecting consideration of multiple-perspectives as a result of self-reflection; supporting Mindfulness benefits: M23; M31; M32; M34)

MDI-1E

LINE- 1E1
I think that taking time to acknowledge my role within a relationship has

made me tackle a task that I have been needing to do for sometime.

(attending to overdue relationship issues as a result of self-reflection; supporting Mindfulness benefits: M26; M32)

LINE-1E2
I also think that by acknowledging my role in a relationship has made me consider other people's work pains.

(consideration of others' working challenges as a result of self-reflection: supporting Mindfulness benefits: M24; M31; M32; M34)

MDI-1F

LINE-1F1
I could see that after being involved in this process is was more aware of my co-worker needs for the projects.

(becoming aware of others' working needs; supporting Mindfulness benefits: M19; M24; M26; M31: M32; M34)

LINE-1F2
I started having small habits such as asking if anyone needed coffee or tea when I was going to grab one for myself.

(developing a more generous demeanor: M01; M14; M26)

OPEN-1G

LINE-1G1
I felt more aware about my relationships, not only professional, but personal.

(becoming more aware of personal and professional relationships: supporting Mindfulness benefits: M19; M26; M31)

LINE-1G2
Sometimes I got home so overwhelmed or woke up so stressed that I could not engage. I feel like we need to develop a better 'education of attention' in order to hear and feel what others are dealing with if we want better engagement attitudes or daily scenarios.

(concluding that more awareness can improve communication and reduce stress in relationships; supporting Mindfulness benefits: M07; M19; M31; M34)

LINE-1G3
Another important point is the fact that since I have been doing therapy for the past two years, this process for me was more of a way to observe things more deeply like I have been doing during my weekly sessions.

(becoming more reflective; supporting Mindfulness benefits: M32)

OPEN-1H

LINE-1H1
It has made me a more considered person reflecting before I act.

(becoming more considerate and reflecting before actions; supporting Mindfulness benefits: M01: M19: M26; M31)

E.3 Category 2

Table 27. Data Presentation for RQ4 - Category 2

Statements refuting the conjecture and supporting other Mindfulness effects

MDI-2A

LINE-2A1
I haven't found that my own working relationships have changed.

(perceiving no direct effect into relationships; supporting Mindfulness benefits: M24; M32)

LINE-2A2
Some people seemed to have really taken the practice on board which may have led to a change that I simply didn't perceive, but in general I think that the practice may have been too introspective to have a noticeable (to me) impact in a group setting.

(concluding that too much introspection veils any relational impact; M24; M34)

MDI-2B

LINE-2B1
With regret, I feel like I did not engage as much as I should have therefore it did not influence me a great deal. However, at the beginning of the process and on the occasions where I did engage and I can see the benefits of being mindful. Just taking some time out of my day to sit back and think would have helped me a great deal. The practice was like a mini reflection, if i had engaged more, perhaps my reflection for the semester would have been stronger, and therefore relationships with course mates more developed.

(concluding no effect due to reduced engagements with the tool

and prospective theory of future effects; supporting Mindfulness benefits: M24; M34)

OPEN-2C

LINE-2C1
I didn't find a direct relationship between the exercise and interpersonal working relationships, but I did find it somewhat helped me put things in perspective.

(putting things in perspective; supporting Mindfulness benefits: M23; M24)

E.4 Category 3

Table 28. Data Presentation for RQ4 - Category 3

Statements supporting other mindfulness effects

MDI-3A

LINE-3A1
More understanding of external factors affecting work and motivation.

(becoming more aware of external influences; supporting Mindfulness benefits: M19; M24)

MDI-3B

LINE-3B1
I consider a lot more what part of my life my priorities affect and I feel I am able to better separate my working from my personal life.

(becoming more clear about the balance between personal and professional priorities; supporting Mindfulness benefits: M24; M32)

MDI-3C

LINE-3C1
I have a better understanding of what is important to me.

(becoming more aware of what's important; supporting Mindfulness benefits: M24: M35)

LINE-3C2
As someone who thinks of everyone and not myself this has highlighted the importance of reflecting on my feelings.

(balancing self-care with care for others as a result of self-reflection; supporting Mindfulness benefits: M19; M32; M34; M35)

LINE-3C3
It also gave me a chance to sit back and take some time out to 'chill' in the busy life I leave.

(taking pauses; supporting Mindfulness benefits: M32)

LINE-3C4
I have also noticed I am more tuned into the surrounding environment. Specifically when walking, noticing things I believe I would not have noticed prior to this activity.

(becoming more discerning of immediate environment; supporting Mindfulness benefits: M19; M24)

LINE-3C5
I quite often find myself reminding me to take take time out to really think deeply.

(reminding self to pause and reflect; supporting Mindfulness benefits: M32)

MDI-3D

LINE-3D1
It made me think more about the why in terms of the working environment. Why and how do I behave, what are my motivators and why do others react in a particular way they do.

(thinking more about possible reasons for self and other behaviours; supporting Mindfulness benefits: M24; M25; M34)

LINE-3D2
However, not being able to go back in the mindfulness history and looking at my former comments did not allow me to see patterns which made a more focused way of personal improvement less impactful.

(concluding that having access to submissions would've yielded more impact; supporting Mindfulness benefits: M34)

MDI-3E

LINE-3E1
On a linear level, taking the time to consider my immediate thoughts at one given point in the day gave me an element of reflection that I have never before considered.

(experiencing deeper levels of self-reflection; supporting Mindfulness benefits: M24; M32)

LINE-2E2
Before starting this course, I wasn't big on reflection, and being mindful of my thoughts. Engaging with this practice has, therefore, shown where the value lies within this practice.

(appreciating the value of self-reflection; supporting Mindfulness benefits: M24; M32; M34)

LINE-2E3
However, for me, personally, I would probably adapt this practice for my own use, using longer passages of reflection. I appreciate there perhaps isn't the time always for this but it would be a great deal more effective for me.

(considering that longer reflections would yield better results; supporting Mindfulness benefits: M34)

MDI-3F

LINE-3F1
This practice made me more aware of the things I found important during work and where I may be more unproductive and weaker and needed to improve.

(recognising areas for self-improvement; supporting Mindfulness benefits: M24; M31; M34)

OPEN-3G

LINE-3G1
At first I found it helpful to observe my reactions and actions through working-self (designer) lenses and separate it from observing my actions in other roles. But soon it felt a bit artificial, as I anyway observe my actions through human being/ person role and as "infinite being/ consciousness/ soul" perspective. So it became hard to give names to other roles like parent of friend. Perhaps this has something to do with me not wanting to identify myself as a designer, or identify others by their discipline. I rather observe myself and others by the way we acknowledge and take responsibility of our own emotions and behaviour (e.g. becoming overwhelmed and having meltdown in a meeting or co-design workshop)

(concluding that roles are limiting and constructing a better approach for self-reflection; supporting Mindfulness benefits: M24; M32; M34)

LINE-3G2
Anyway, maybe the biggest influence for me was the daily reminder and different angle of scanning my being. Even though I wasn't able to jump to the computer to fill this form as often as I wanted, the exercise kept coming to my mind.

(sustaining an awareness of the practice and different perspectives of self-reflection; supporting Mindfulness benefits: M23; M24; M32)

OPEN-3H

LINE-3H1
I believe that engagement helped me visualize what are my core values (which are usually also the values my family and friends carry with them) and the values of the group I have been working with during my master research.

(becoming aware of self and other core values; supporting Mindfulness benefits: M24; M25; M31; M35)

LINE-3H2
What I found most interesting about this practice is that sometimes your personal life impacts hugely on your engagement with the group. I realized that I still have a lot of barriers when it comes to participatory approaches.

(becoming aware of impact of personal on professional, and drawing conclusions of areas needing improvement upon self-reflection; supporting Mindfulness benefits: M24; M31; M32: M34)

LINE-3H3
On the other hand, the mindfulness practice sometimes helped me understand what were my concerns in specific moments and helped me clear out a bit what my issues were in those moments. It also helped me during my therapy sessions because there I usually work on self understanding, self trust, self confidence, and when you do mindfulness practices you are able to target simple issues into core values.

(correlating the practice with clarity of values; supporting Mindfulness benefits: M10; M32: M34)

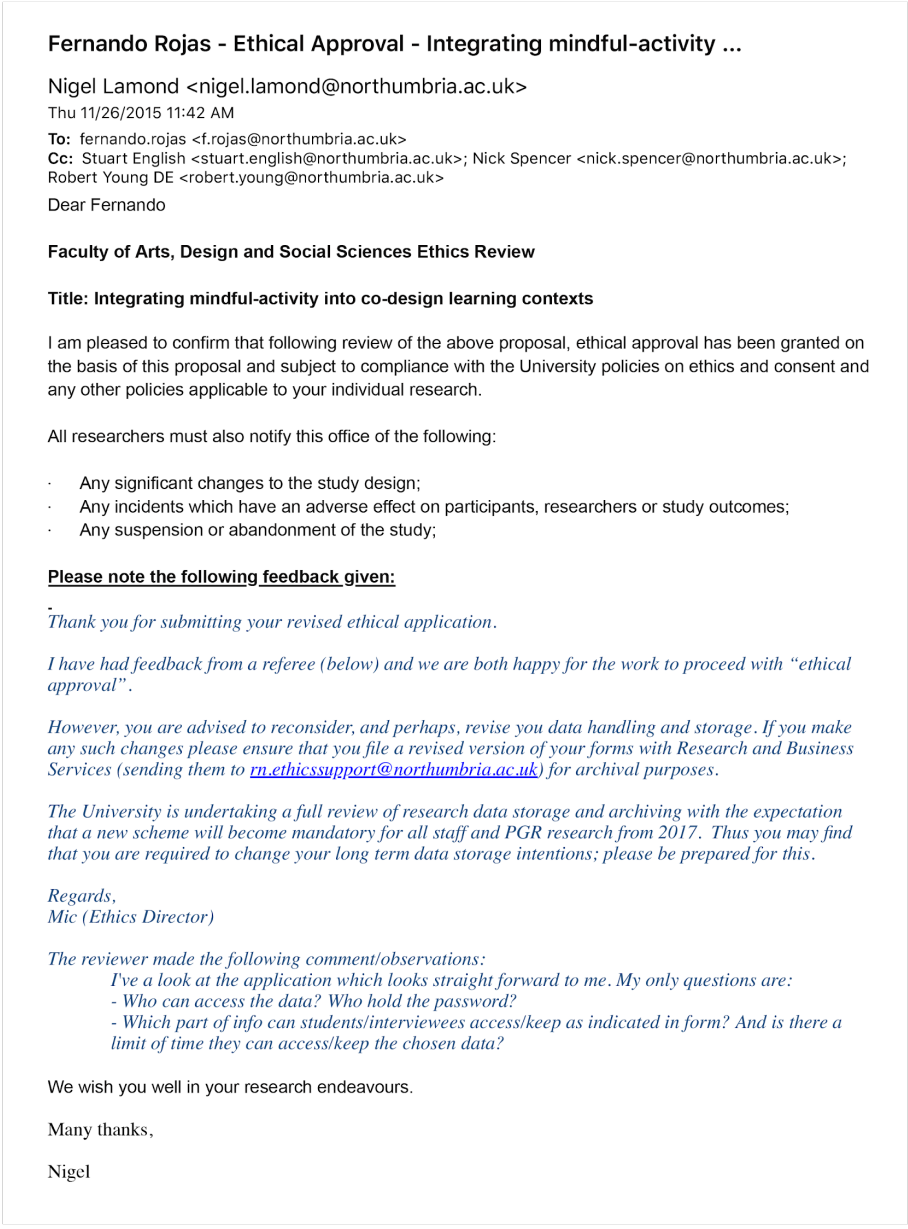
Appendix F
INDUCTION & DATA COLLECTION

Contents

This Appendix contains screenshots and footnotes of the forms utilized in the system of participant induction and data collection devised for this study. All forms are electronic and are stored in a private restricted-access cloud account managed by the researcher.

No identifiable participant information was used as part of the research.

F.1 Ethics Approval



Fernando Rojas - Ethical Approval - Integrating mindful-activity ...

Nigel Lamond <nigel.lamond@northumbria.ac.uk>
Thu 11/26/2015 11:42 AM

To: fernando.rojas <f.rojas@northumbria.ac.uk>
Cc: Stuart English <stuart.english@northumbria.ac.uk>; Nick Spencer <nick.spencer@northumbria.ac.uk>; Robert Young DE <robert.young@northumbria.ac.uk>

Dear Fernando

Faculty of Arts, Design and Social Sciences Ethics Review

Title: Integrating mindful-activity into co-design learning contexts

I am pleased to confirm that following review of the above proposal, ethical approval has been granted on the basis of this proposal and subject to compliance with the University policies on ethics and consent and any other policies applicable to your individual research.

All researchers must also notify this office of the following:

- Any significant changes to the study design;
- Any incidents which have an adverse effect on participants, researchers or study outcomes;
- Any suspension or abandonment of the study;

Please note the following feedback given:

Thank you for submitting your revised ethical application.

I have had feedback from a referee (below) and we are both happy for the work to proceed with "ethical approval".

However, you are advised to reconsider, and perhaps, revise you data handling and storage. If you make any such changes please ensure that you file a revised version of your forms with Research and Business Services (sending them to rn.ethicssupport@northumbria.ac.uk) for archival purposes.

The University is undertaking a full review of research data storage and archiving with the expectation that a new scheme will become mandatory for all staff and PGR research from 2017. Thus you may find that you are required to change your long term data storage intentions; please be prepared for this.

Regards,
Mic (Ethics Director)

The reviewer made the following comment/observations:
I've a look at the application which looks straight forward to me. My only questions are:
- Who can access the data? Who hold the password?
- Which part of info can students/interviewees access/keep as indicated in form? And is there a limit of time they can access/keep the chosen data?

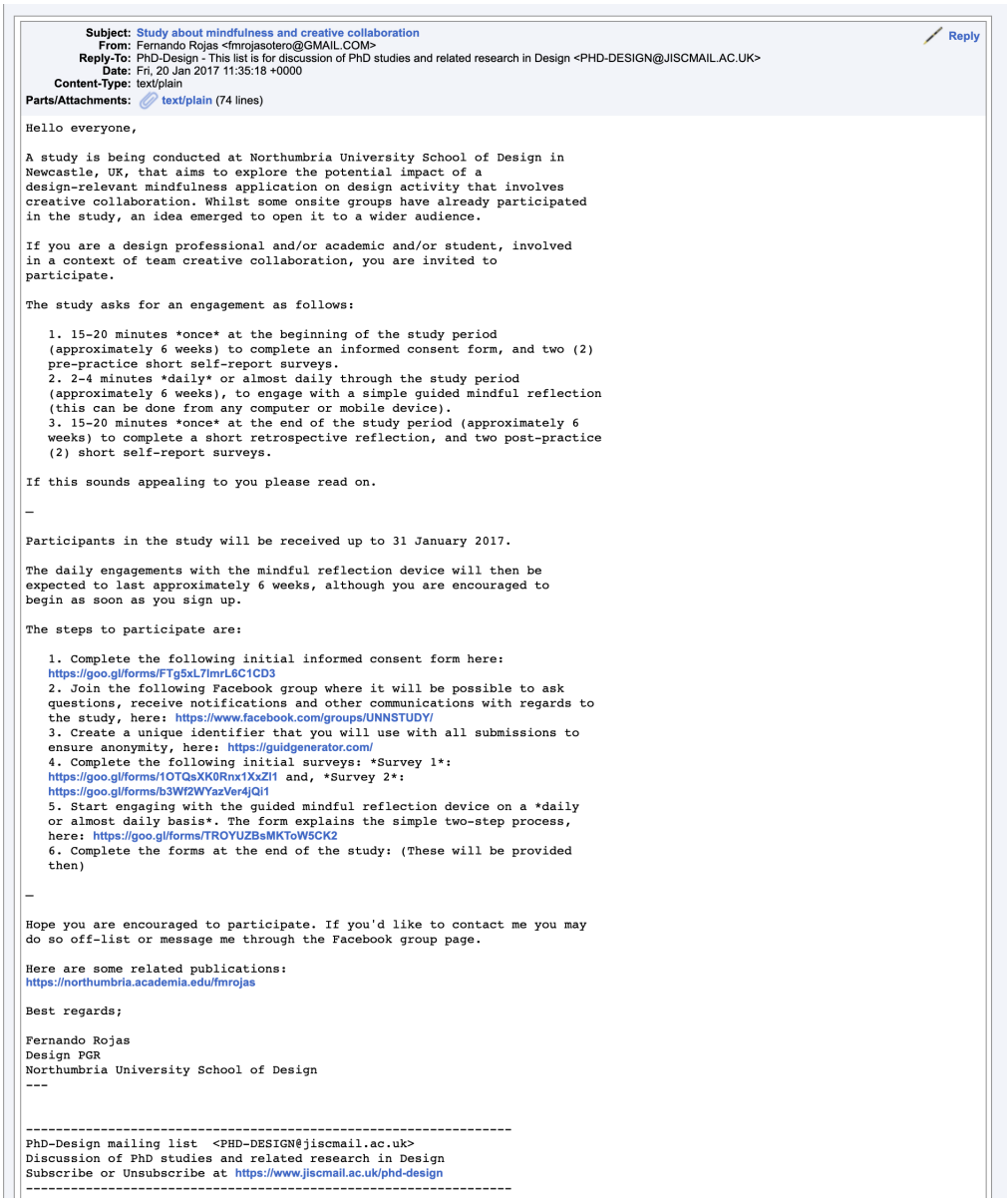
We wish you well in your research endeavours.

Many thanks,

Nigel

Figure 10. Ethics Approval Letter

F.2 Open Group Invitation to Participate[1]



Subject: Study about mindfulness and creative collaboration
From: Fernando Rojas <fmrojasotero@GMAIL.COM>
Reply-To: PhD-Design - This list is for discussion of PhD studies and related research in Design <PHD-DESIGN@JISCMAIL.AC.UK>
Date: Fri, 20 Jan 2017 11:35:18 +0000
Content-Type: text/plain
Parts/Attachments: text/plain (74 lines)

Reply

Hello everyone,

A study is being conducted at Northumbria University School of Design in Newcastle, UK, that aims to explore the potential impact of a design-relevant mindfulness application on design activity that involves creative collaboration. Whilst some onsite groups have already participated in the study, an idea emerged to open it to a wider audience.

If you are a design professional and/or academic and/or student, involved in a context of team creative collaboration, you are invited to participate.

The study asks for an engagement as follows:

1. 15-20 minutes *once* at the beginning of the study period (approximately 6 weeks) to complete an informed consent form, and two (2) pre-practice short self-report surveys.
2. 2-4 minutes *daily* or almost daily through the study period (approximately 6 weeks), to engage with a simple guided mindful reflection (this can be done from any computer or mobile device).
3. 15-20 minutes *once* at the end of the study period (approximately 6 weeks) to complete a short retrospective reflection, and two post-practice (2) short self-report surveys.

If this sounds appealing to you please read on.

–

Participants in the study will be received up to 31 January 2017.

The daily engagements with the mindful reflection device will then be expected to last approximately 6 weeks, although you are encouraged to begin as soon as you sign up.

The steps to participate are:

1. Complete the following initial informed consent form here: https://goo.gl/forms/FTg5xL7ImrL6C1CD3
2. Join the following Facebook group where it will be possible to ask questions, receive notifications and other communications with regards to the study, here: https://www.facebook.com/groups/UNNSTUDY/
3. Create a unique identifier that you will use with all submissions to ensure anonymity, here: https://guidgenerator.com/
4. Complete the following initial surveys: *Survey 1*: https://goo.gl/forms/1OTQsXK0Rnx1XxZI1 and, *Survey 2*: https://goo.gl/forms/b3Wf2WYazVer4jQi1
5. Start engaging with the guided mindful reflection device on a *daily or almost daily basis*. The form explains the simple two-step process, here: https://goo.gl/forms/TROYUZBsMKToW5CK2
6. Complete the forms at the end of the study: (These will be provided then)

–

Hope you are encouraged to participate. If you'd like to contact me you may do so off-list or message me through the Facebook group page.

Here are some related publications:
https://northumbria.academia.edu/fmrojas

Best regards;

Fernando Rojas
Design PGR
Northumbria University School of Design

PhD-Design mailing list <PHD-DESIGN@jiscmail.ac.uk>
Discussion of PhD studies and related research in Design
Subscribe or Unsubscribe at https://www.jiscmail.ac.uk/phd-design
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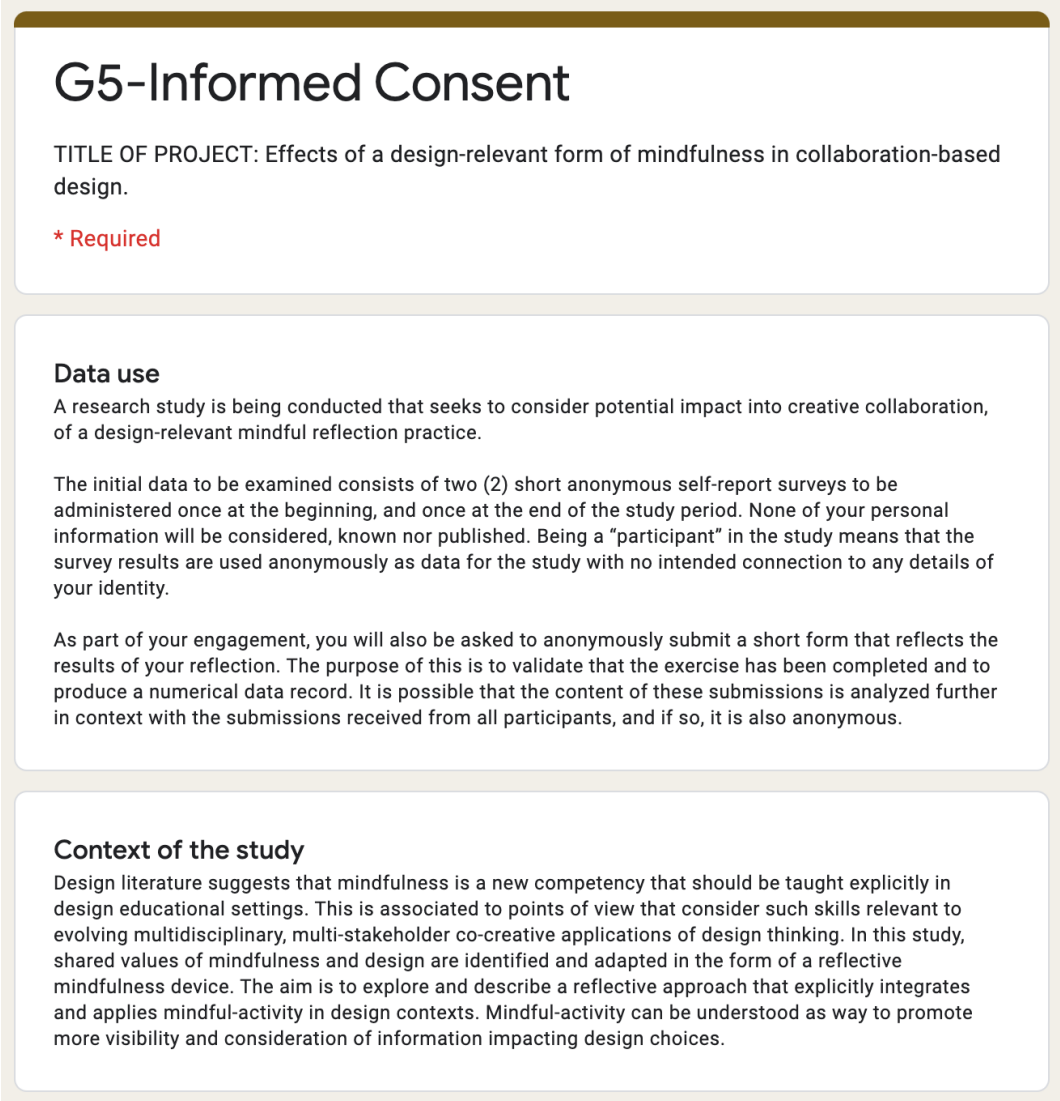
Figure 11. Open Group Invitation to Participate

[1] Open Group Invitation to Participate (n.d.) Retrieved from: https://www.jiscmail.ac.uk/cgi-bin/wa-jisc.exe?A2=ind1701&L=PHD-DESIGN&O=D&P=52963

F.3 Informed Consent[2] *(1 of 2)*



G5-Informed Consent

TITLE OF PROJECT: Effects of a design-relevant form of mindfulness in collaboration-based design.

* Required

Data use

A research study is being conducted that seeks to consider potential impact into creative collaboration, of a design-relevant mindful reflection practice.

The initial data to be examined consists of two (2) short anonymous self-report surveys to be administered once at the beginning, and once at the end of the study period. None of your personal information will be considered, known nor published. Being a "participant" in the study means that the survey results are used anonymously as data for the study with no intended connection to any details of your identity.

As part of your engagement, you will also be asked to anonymously submit a short form that reflects the results of your reflection. The purpose of this is to validate that the exercise has been completed and to produce a numerical data record. It is possible that the content of these submissions is analyzed further in context with the submissions received from all participants, and if so, it is also anonymous.

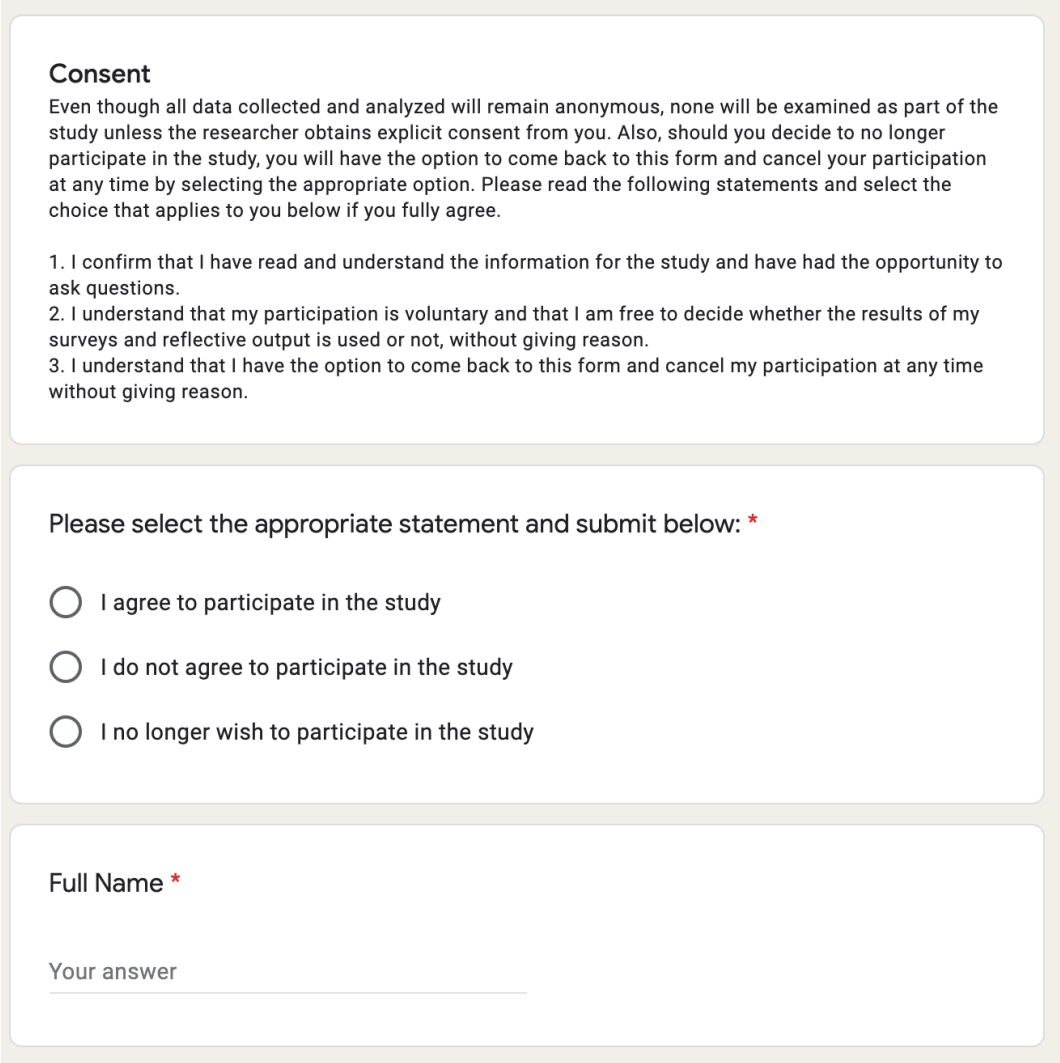
Context of the study

Design literature suggests that mindfulness is a new competency that should be taught explicitly in design educational settings. This is associated to points of view that consider such skills relevant to evolving multidisciplinary, multi-stakeholder co-creative applications of design thinking. In this study, shared values of mindfulness and design are identified and adapted in the form of a reflective mindfulness device. The aim is to explore and describe a reflective approach that explicitly integrates and applies mindful-activity in design contexts. Mindful-activity can be understood as way to promote more visibility and consideration of information impacting design choices.

Figure 12. Informed Consent - 1 of 2

[2] Informed Consent Form (n.d). Retrieved from https://goo.gl/forms/3P36IHPxZi5qF04g1

F.3.1 Informed Consent *(2 of 2)*



Consent

Even though all data collected and analyzed will remain anonymous, none will be examined as part of the study unless the researcher obtains explicit consent from you. Also, should you decide to no longer participate in the study, you will have the option to come back to this form and cancel your participation at any time by selecting the appropriate option. Please read the following statements and select the choice that applies to you below if you fully agree.

1. I confirm that I have read and understand the information for the study and have had the opportunity to ask questions.
2. I understand that my participation is voluntary and that I am free to decide whether the results of my surveys and reflective output is used or not, without giving reason.
3. I understand that I have the option to come back to this form and cancel my participation at any time without giving reason.

Please select the appropriate statement and submit below: *

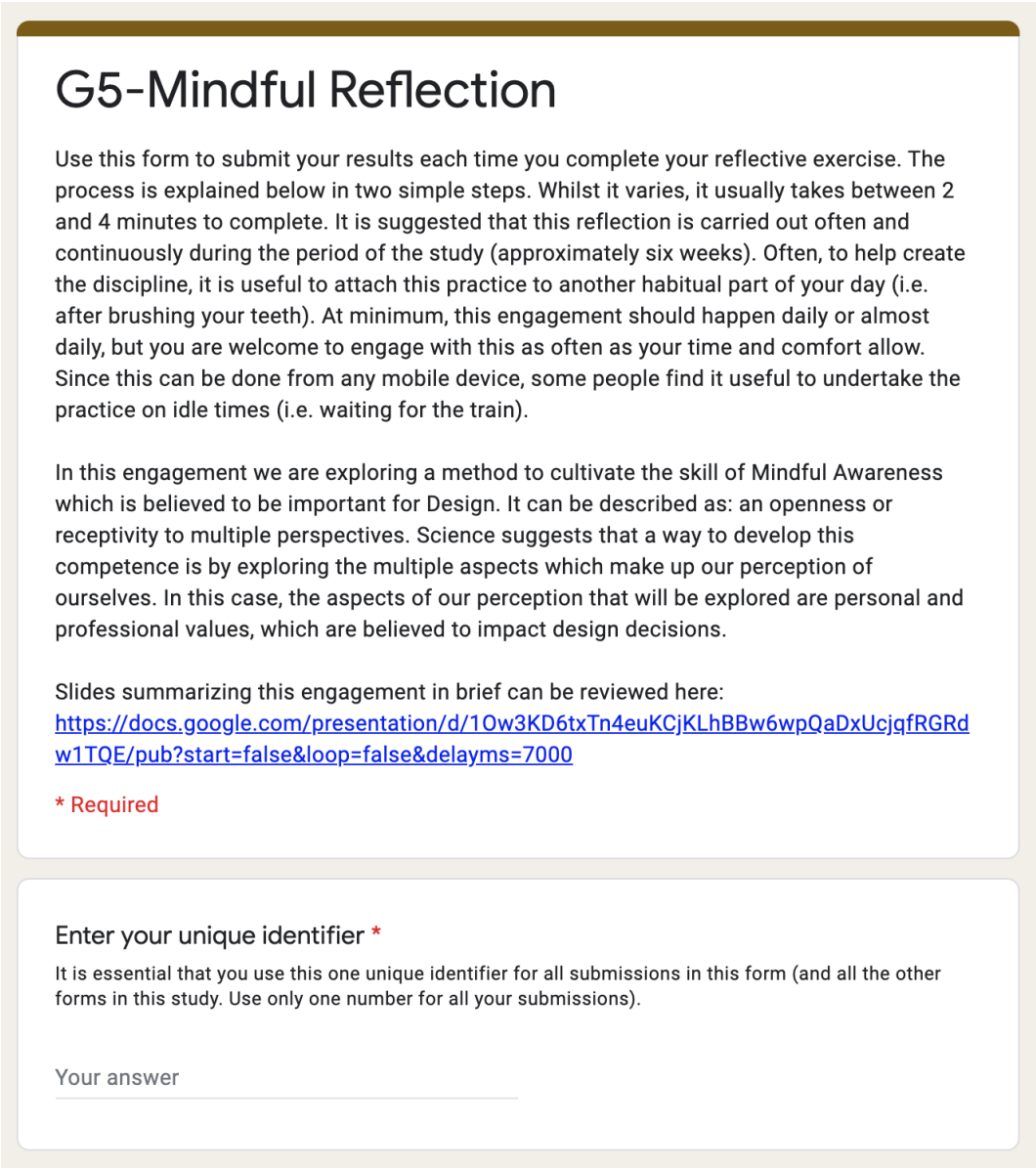
- ◯ I agree to participate in the study
- ◯ I do not agree to participate in the study
- ◯ I no longer wish to participate in the study

Full Name *

Your answer

Figure 13. Informed Consent - 2 of 2

F.4 Mindful Reflection Form[3] *(1 of 3)*



G5-Mindful Reflection

Use this form to submit your results each time you complete your reflective exercise. The process is explained below in two simple steps. Whilst it varies, it usually takes between 2 and 4 minutes to complete. It is suggested that this reflection is carried out often and continuously during the period of the study (approximately six weeks). Often, to help create the discipline, it is useful to attach this practice to another habitual part of your day (i.e. after brushing your teeth). At minimum, this engagement should happen daily or almost daily, but you are welcome to engage with this as often as your time and comfort allow. Since this can be done from any mobile device, some people find it useful to undertake the practice on idle times (i.e. waiting for the train).

In this engagement we are exploring a method to cultivate the skill of Mindful Awareness which is believed to be important for Design. It can be described as: an openness or receptivity to multiple perspectives. Science suggests that a way to develop this competence is by exploring the multiple aspects which make up our perception of ourselves. In this case, the aspects of our perception that will be explored are personal and professional values, which are believed to impact design decisions.

Slides summarizing this engagement in brief can be reviewed here: https://docs.google.com/presentation/d/1Ow3KD6txTn4euKCjKLhBBw6wpQaDxUcjqfRGRdw1TQE/pub?start=false&loop=false&delayms=7000

* Required

Enter your unique identifier *

It is essential that you use this one unique identifier for all submissions in this form (and all the other forms in this study. Use only one number for all your submissions).

Your answer

Figure 14. Mindful Reflection Form - 1 of 3

[3] Mindful Reflection Form (n.d.). Retrieved from https://goo.gl/forms/tCrC85FY7wAZB5Dj2

F.4.1 Mindful Reflection *(2 of 3)*

YOUR OBSERVING SELF

For all your engagements, always start and return to your Observing Self. A Self is understood as a role or identity. Your Observing Self represents the entity from where you are able to observe all your other roles. Figure (1) below offers an image of this. For this exercise, you will reflect from the perspective of two of your roles (or selves). One of your roles will be DESIGNER in the context of a collaborative setting; and the second one can be any other of your roles that may arise (designer in any context, concerned citizen, cyclist, sibling, cousin, health enthusiast, business owner, engineer, musician, parent, teacher, etc.).

Figure (1).

Figure 15. Mindful Reflection Form - 2 of 3

F.4.2 Mindful Reflection *(3 of 3)*

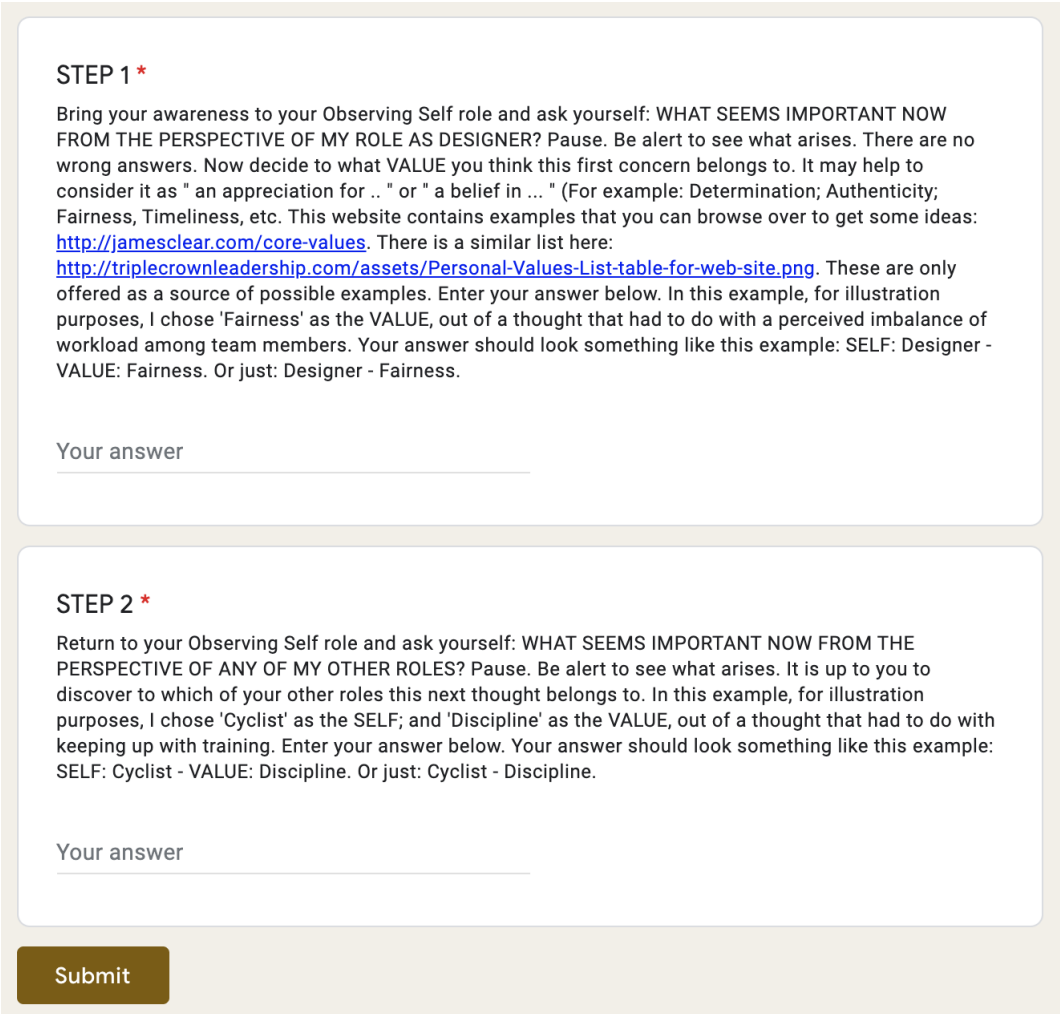


Figure 16. Mindful Reflection Form - 3 of 3

F.5 Final Reflection[4]

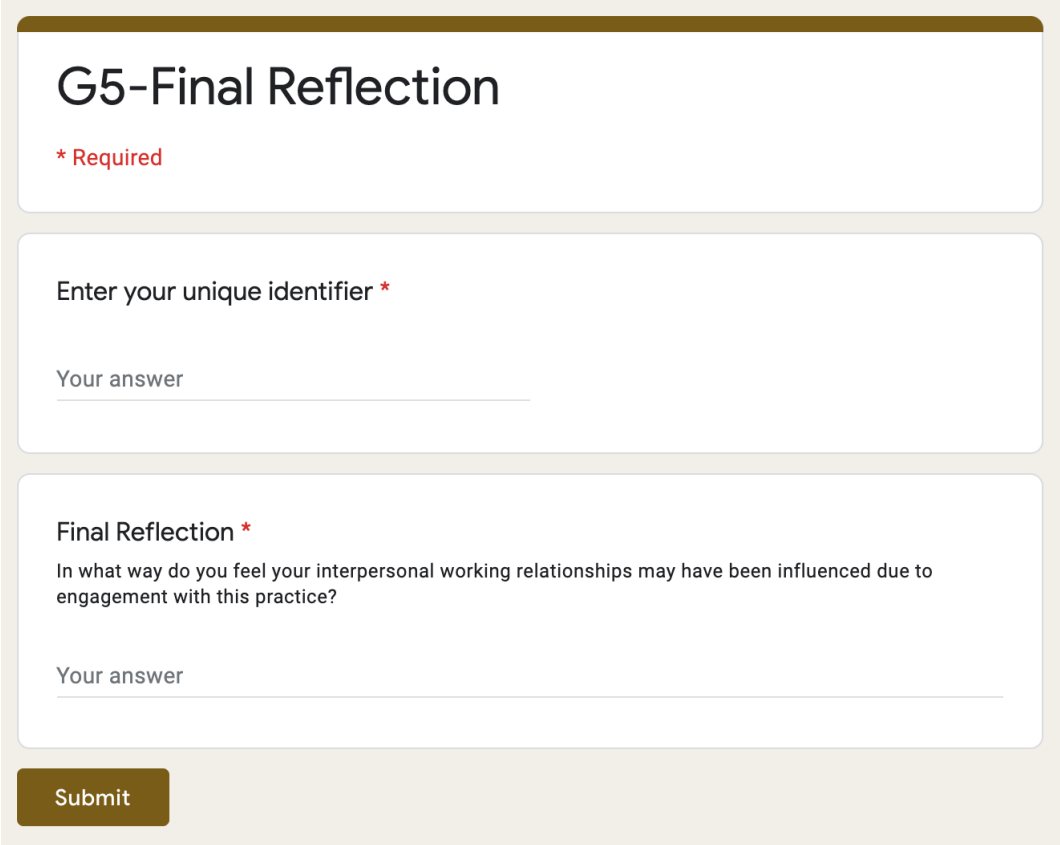


Figure 17. Final Reflection Form

[4] Final Reflection Form (n.d.) Retrieved from: https://goo.gl/forms/xw0pK9bDd4t7ZD5D3

Appendix G
DYNAMIC STAKEHOLDER TOOL

In the initial stages of the development of the *mindful design device*, and adopting viewpoints of a mindfulness research stream known as socio-cognitive mindfulness (Yeganeh & Kolb, 2009; Djikic, 2014), master level design students were encouraged to capture stakeholder perspectives of their current collaborative project through dynamic visual maps in a reciprocal way. These reflections were named *reciprocal perspectives* (Rojas et al., 2017), as the conceived mindful activity influenced by the concepts of re-categorizing and relabelling, in opposition to mindless rigid reliance on old categories (Langer, 2014). *Reciprocal perspectives*, which also embody elements of appreciative inquiry (Cooperrider & Whitney, 1999), are understood as possibility propositions that bridge the best of *what-is* with collective speculation of *what-might-be*. They describe what works in a system and change negative accounts into descriptive points of view and into new possibilities. The premise for this approach is that a system is not a problem to be solved but a mystery to be embraced by paying attention to novelty and questioning assumptions.

Reciprocal perspectives were presented to Multidisciplinary Innovation[1] design students in the following way:

- *Reciprocal perspectives* describe and value what works in the current system and use that as a base to envision what might be and dialogue what should be.
- *Reciprocal perspectives* re-label negative accounts into descriptive points of view and/or into new possibilities. For example:
    - *The glass is half empty* to *the glass is half full*
    - *The glass is half empty* to *the glass has water*

[1] Multi-Disciplinary Innovation MA/MSc, Northumbria University; The Day We Met (n.d.) Retrieved form: https://www.northumbria.ac.uk/study-at-northumbria/courses/multidisciplinary-innovation-dtfmdy6/the-day-we-met/

- *The glue does not adhere as expected* to *the glue adheres for a short amount of time*

Whilst this exercise can clearly be viewed as a mindful process, it was determined that the tool required an element which is deemed essential to the quality of attention people apply to their actions within systems; *inner-focus* or as referred to in this document, *internal views* (Goleman, 2013; Scharmer & Kaufer, 2013). Contemporary co-creative approaches promote that more stakeholders participate directly in the creation of a design outcome (Maase & Dorst, 2006; Young, 2012; Hocking, 2011) and whilst *reciprocal perspectives* promote mindful consideration of multiple stakeholders, they do not naturally include deliberate attention to the design component's *internal views*. Consideration of these multiple stakeholder perspectives are understood as *external views* from the standpoint of the design component. *Internal views* are understood as a self-observing capacity of individuals and teams in co-creative contexts and described by Scharmer & Kaufer (2013) as a way to help a system see itself and connect to its emerging future self. This, in their view, is accomplished by connecting different views simultaneously, and 'bending the beam of attention' back to the *observing self* and to the sources of creativity.

A revised version of this mindfulness application reflected this attempt to scrutinise internal views within the design problem framing by highlighting the role of the design component within a framework of stakeholders called the *creative-consortia* (Kyffin, Aftab & Spencer, 2017). This framework is conceived whilst operating under the recognition that multidisciplinary and multi-stakeholder collaborative teams are the best

way to co-create for social innovation. It comprises 4 pillars of a quadruple helix for the creation of social value that are:

- society (citizens),
- university (student design team),
- industry, and
- government.

Here, they suggest design acts as a *connector-integrator* to create the right environment for collaboration. The researcher's argument is that, if in a co-creative context, the design component leads the design process and collaboration effort it is through this design component that mindfulness elements could be integrated.

Goleman (2013) describes a leader's *triple-focus* as vital attention abilities. These are:

- *inner-focus*, which fosters self-awareness and self-management,
- *other-focus*, which fosters empathic-awareness, and
- *outer-focus*, which fosters systems awareness.

Co-creation in the context of the *creative-consortia* is by definition an approach that aims for sustainable systems awareness and social innovation outcomes. Therefore, the *outer-focus* is assumed to be the genesis of the scope of a co-creative process that aims for social innovation. The relevant additional attention-training aims would apply to the *inner-focus* and *other-focus* of the design component and stakeholders in their participatory interactions. The concept of the *creative-consortia* is a proposition for managing complexity of a multi-stakeholder value system. The premise for this adaptation, that eventually came to be known during the course as the Dynamic Stakeholder Tool (Sterling, 2015; Sterling,

Bailey, Spencer, Adey, Chatzakis & Hornby, 2018), is that design, as a *connector-integrator*, can promote integration through an adaptation of The Wheel of Awareness (Siegel, 2012; 2016).

If this concept is interpreted and extrapolated to understand the *creative-consortia* as a complex stakeholder system, how can this system be integrated through mindful intervention of a design *connector-integrator*? The discrete aspects of this system (to be differentiated) are people with values pertinent to their multiple roles or identities; and the way they interact (link) is through communication. Consequently, attuned-communication, defined by Siegel (2012) as the quality of integrative relationships in which differences are respected and compassionate connections are cultivated, is a highly desired outcome. In the original wheel model the hub represents space to pause and reflect. This application proposed an adapted visual metaphor, where the hub is the design connector-integrator, providing the space for recognition of all stakeholders' uniqueness and encouraging attuned connections.

The process aimed to promote attuned communication through differentiation and linkage of the components of the *creative-consortia*, where the discrete components are people recognizing their roles and values, whose interaction is through communication. The metaphoric hub is the design component, as the connector-integrator, and the constituents of the rim are stakeholder members of society (citizens), industry and government as it may relate to the particular design brief (Figure 18).

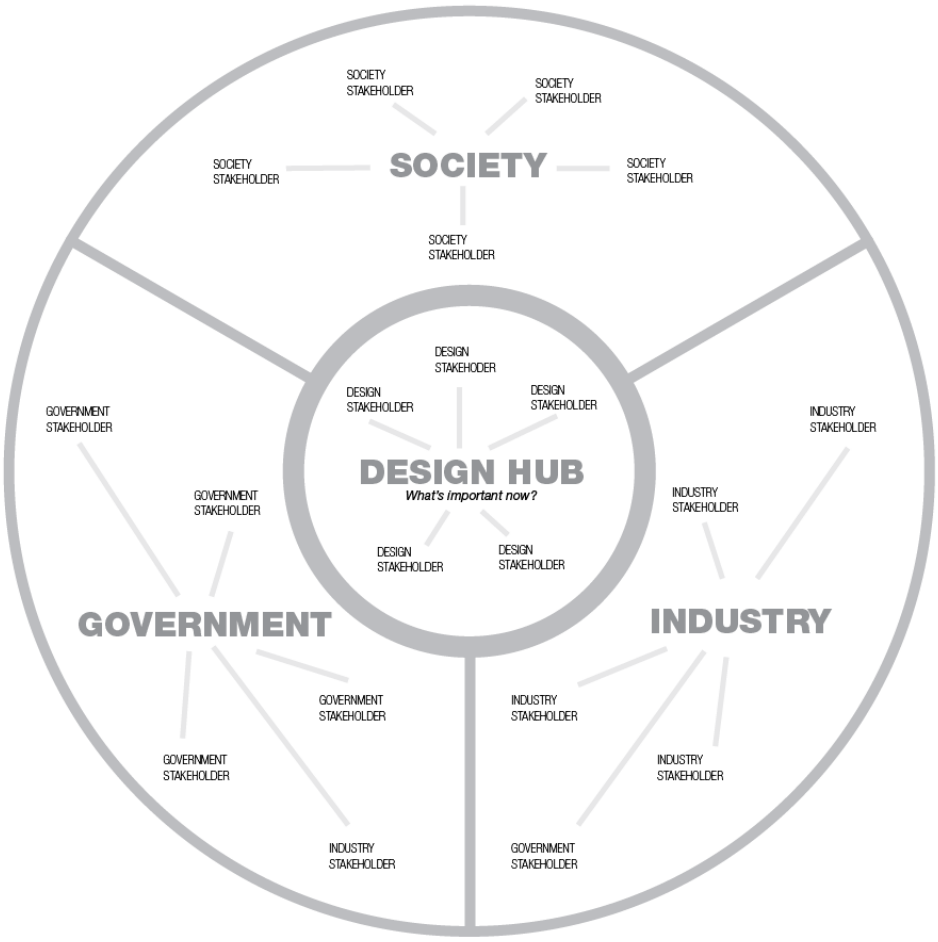


Figure 18. The *creative-consortia*. The design component acts as a connector-integrator in the hub, and industry, society and government as constituents of the rim.

Students were encouraged to capture stakeholder perspectives using internal and external system views as the mindfulness component. External systems views consist of the project brief sets of stakeholder perspectives including the design team as a stakeholder set (and as the source of internal systems views). Internal systems views consist of a designer's personal and professional values and beliefs. Ideally, as the map grows and morphs dynamically, and categories form to clarify values further, each category becomes a new centre-of-inquiry (Figure 19).

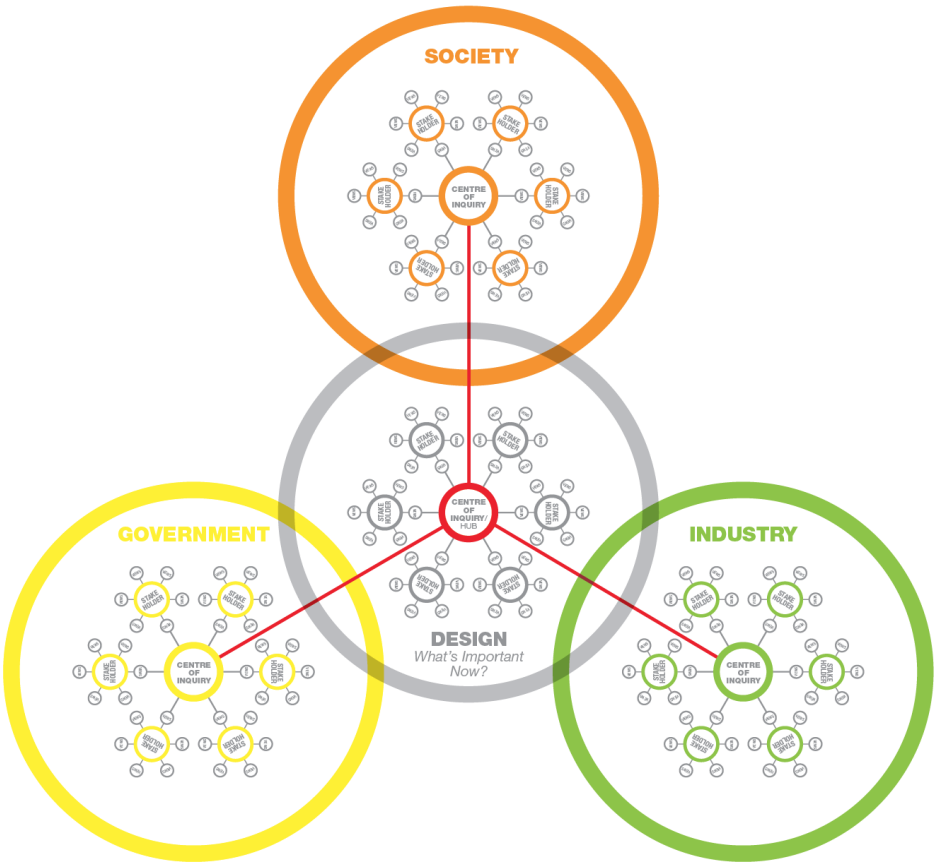


Figure 19. Centres-of-inquiry. Around the design hub is a distinct radiant mind map.

These initial conceptualizations of the intervention within a design class, visualized the device as a design problem framing tool imbued with mindfulness techniques. The goal was to effectively include internal views as part of the considered design problem context. This process was perceived by some students as foreign or unnatural, and that it brought too many aspects for consideration and interpretation by them when added to other new processes of learning collaboration-based design approaches running in tandem. It was viewed as possibly bound to cause confusion and to be viewed as a burden. Others embraced the challenge (Figures

20, 21, 22) and eventually a derivation of the Dynamic Stakeholder Tool was used in research publishing (Sterling et al., 2018, p7).

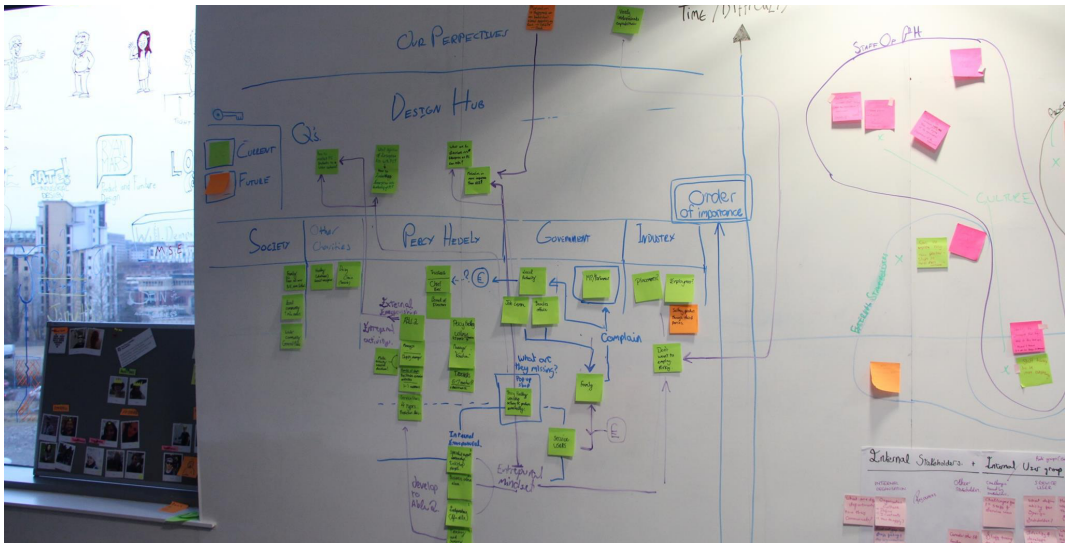


Figure 20. Dynamic Stakeholder Tool. Example 1 of design student engagement.

Figure 21. Dynamic Stakeholder Tool. Example 2 of design student engagement.

Figure 22. Dynamic Stakeholder Tool. Example 3 of design student engagement.

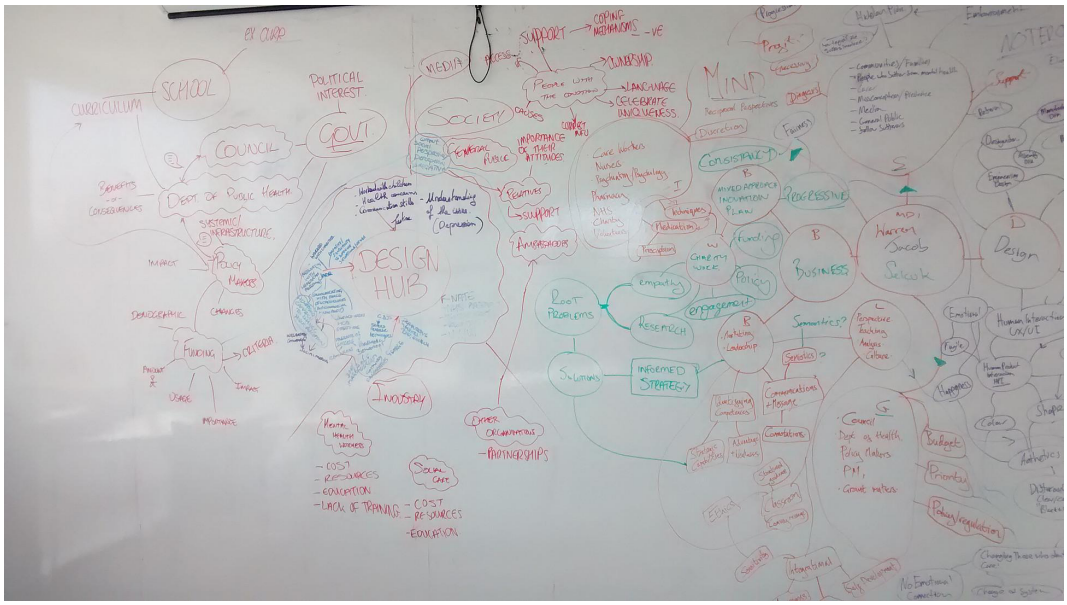


Figure 23. Dynamic Stakeholder Tool. Example 4 of design student engagement.

These initial experiences led to the final iteration of the device which whilst it promotes a mind training discipline relevant to design concerns, for the

purpose of the study it remains less intrusive, does not interfere directly, yet runs parallel to other current taught approaches as a process of discovery of unobserved individual values and beliefs. Ultimately, the interest of the study was to determine whether the design-relevant mindfulness tool had significant effects and/or correlations between mindful and cooperative disposition. In this case opportunities are potentially created for the prospective evolution of self-contained academic tools pertinent to design, which can foster distinct skills and behaviours in design students.

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